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Research Product 81-7

TRAINING MATERIALS AND DATA REQUIREMENTS FOR DRIVER TRAINER (DT) TRAINING TEST SUPPORT PLAN

ARI FIELD UNIT AT FORT KNOX, KENTUCKY

August 1980

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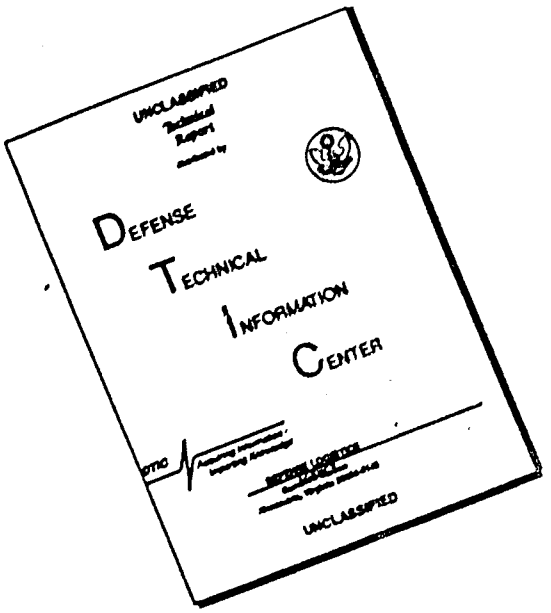

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The material presented in this training test support plan for the XM1 19L10 driver trainer was developed for use during OT IT, to answer three of the operational issues asked in the IEP for the DT, namely:

Issue 2.2.1 What is the training effectiveness of the XM1 driver trainer as compared to the baseline training method?

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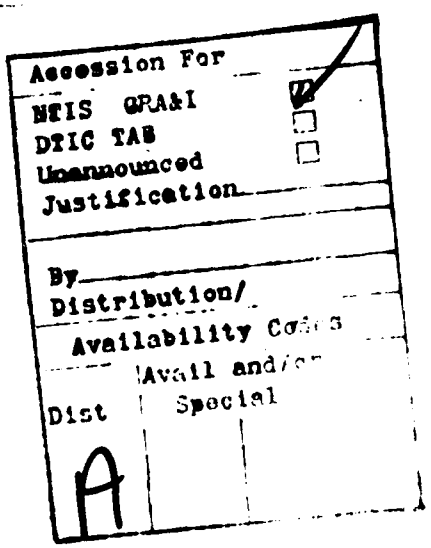
Issue 2.1.2 What is the training transfer of the XM1 driver trainer as compared to the baseline training method?

Issue 2.1.3 What are the training resources used for each of the alternative training programs?



Research Product 81-7

TRAINING MATERIALS AND DATA REQUIREMENTS FOR DRIVER TRAINER (DT) TRAINING TEST SUPPORT PLAN

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Individual Training Technology

FOREWORD

The Fort Knox Field Unit of the Army Research Institute for the Behavioral and Social Sciences (ARI) carries out research and exploratory development in the area of Armor training. An objective of this work is to develop, through analytic and field research, tank crew and individual training methods that are effective and efficient.

The project of which this report is a part was conducted by personnel of the Human Resources Research Organization (HumRRO) under Contract No. MDA 903-79-C-0582 and monitored by Donald F. Haggard, Chief of ARI Field Unit at Fort Knox. The research was done under ARI FY 78 Work Program, Army Project 2Q762722A777, Individual Training Technology, Task D: Technology for Front-End Analysis of Armor Systems, Work Unit 3: Simulation Characteristics of Armor Systems. The work is responsive to requirements of the US Army Armor School at Fort Knox, the Army Training and Doctrine Command, and the Army Forces Command.

JOSEPH ZEIDNER
Technical Director

SUMMARY

The material in this training TSP for the XM1 19L10 DT was developed for use during OT II, to answer three of the operational issues asked in the IEP for the DT, namely:

Issue 2.1.1	What is the training effectiveness of the XM1 driver trainer as compared to the baseline training method?
Issue 2.1.2	What is the training transfer of the XM1 driver trainer as compared to the baseline training method?
Issue 2.1.3	What are the training resources used for each of the alternative training programs?

The test concept for the DT, developed to yield maximum data to address the IEP issues, incorporates three test groups, as follows:

Group I:	Driver trainer only (soldiers do not get into an XM1 tank until they are [transfer] tested).
Group II:	Driver trainer, supplemented by XM1 tank.
Group III:	XM1 tank supplemented by a wooden mockup(MU) to be built by TASC.

In order to evaluate the XM1 driver training program, data forms were prepared to collect data in three areas:

1. Training resource requirements (Issue 2.1.3).
2. Maneuver pretest.
3. Transfer effeciveness (Issue (2.1.2).

Training effectiveness (Issue 2.1.1) is evaluated by means of data collected for training resource requirements, on the Soldier Training Reports.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

INTRODUCTION

Recognizing both the potential benefits and the potential risks associated with the use of training devices and simulators as adjuncts and substitutes for operational equipment, the Army has evolved a multi-tiered assessment policy, in which plans and devices are evaluated at successive phases of development, from concept evaluation to operational testing. Certain parts of the Army's device-evaluation policy, namely the parts that deal with the design of baseline and experimental courses of instruction to address operational issues defined in the Independent Evaluation Plan (IEP), and the design and preparation of specifications for elements of the training TSP are interrelated to the extent that one part (the TSP) is "required" by the other part (the IEP).

The material presented in this training TSP for the XM1 19L10 driver trainer (DT) was developed in response to the test concept for OT II to answer three of the operational issues asked in the IEP for the DT,[1] namely:

Issue 2.1.1 What is the training effectiveness of the XM1 driver trainer as compared to the baseline training method?

Issue 2.1.2 What is the training transfer of the XM1 driver trainer as compared to the baseline training method?

Issue 2.1.3 What are the training resources used for each of the alternative training programs?

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[1]Author. Final Independent Evaluation Plan for XM1 Driver Trainer. March 1980.

ORGANIZATION

The training materials and data requirements are organized as follows:

Chapter 1 Training Concepts for XM1 DT

Chapter 2 Data Requirements

Appendix A Pretest and Posttest

Appendix B HumRRO Developed Objectives for Training Program

Appendix C Performance-Oriented Instruction

Appendix D Test Development

Appendix E Training Resource Requirement Forms

CHAPTER ONE

TRAINING CONCEPTS FOR XM1 DT

Overview

The test concept[1] for the XM1 driver trainer, developed to yield maximum data to address the IEP issues, incorporates three test groups. The three groups are:

Group I: Driver trainer only (soldiers do not get into an XM1 tank until they are [transfer] tested).

Group II: Driver trainer, supplemented by XM1 tank.

Group III: XM1 tank supplemented by a wooden mockup (MU) to be built by TASC.

Any discussion of, reference to, or instructions regarding the tank-plus-mockup group assumes that the to-be-designed mockup will have capabilities nearly identical to those of an XM1 DT, will be instructor supervised but will have no visual system. Specifications are not yet available regarding the mockup. Task assignments (described below) are therefore subject to change.

Definitions

This section defines and discusses some terms and concepts used in the TSP.

Training Effectiveness: The measurable change in performance demonstrated within the training environment during a particular training program. Given by the difference between pretest and posttest scores on the device.

Transfer Effectiveness: The amount of on-the-job proficiency ascribable to training. Given by scores on tests administered on job-relevant media after training to mastery on other media; for example, people trained using simulators are tested using tanks.

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[1]Bloedorn, G.W. Memorandum, "Training Test Support Package for XM1 Training Devices OT II." 24 April 1980.

DT/XM1/MU Tasks: Tasks which can be taught practicably using the DT, the XM1, or the MU. Normal operating procedures make up this category. As an exception to this category, tasks essential for safety reasons are included. Examples are:

1. Start tank engine (Program 3 Procedure 12)[1] (Module C Task 1C).[2]
2. Power down hull (Program 3 Procedure 15) (Module M Task 1M).
3. Miscellaneous warning and caution lights (Program 9) (Module F).

DT/XM1 Tasks: Tasks which can be taught practicably using either the DT or the XM1. Normal driving skills are included in this category. Examples include:

1. Drive level dirt road at 15 mph and 25 mph (Program 21) (Module E Task 1E).
2. Drive unimproved road over numerous ditches and bumps (Program 24) (Module E Task 1E; Module Q Tasks 1Q, 2Q, 3Q).

DT Tasks: Tasks which can be taught using the DT (and the MU), but which because of safety, equipment-damage, or other considerations, are not feasible to teach using the XM1. Tasks in this category include degraded driving tasks which are responses to malfunctions and emergency procedures when indications of such malfunctions cannot readily be inserted during tank operation. Examples of DT tasks include:

1. Engine cranks but aborts start (Program 5 Procedure 43).
2. Engine will not shut down (Program 6 Procedure 45).
3. Steering fails (Program 11 Procedure 82).
4. Transmission gear shift CB pops (Program 21 Malfunction 19).
5. Fuel pump fails while tank is being driven (Program 21 Malfunction 5).

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[1]These are Program/Procedure numbers for the Sperry Secor procedure programs. Author. XM1 Tank Driver Trainer, Device A17B13, Trainer Engineer Design Report (Final). Data Item A002, Contract N61339-79-C-0024, Sperry Secor Simulation Systems, Document No. SE-379-EDR-930121, January 1980.

[2]These are Module/Task numbers for the HumRRO developed XM1 driver objectives.

XM1 Tasks: Tasks which are practicably taught using the XM1, but which because of design limitations or other considerations, are not practicably taught using the DT. Included in this category are essentially maintenance type tasks outside the Driver's Station which the driver traditionally does. Examples are:

1. Remove track support chain (Module O Task 80).
2. Retrieve mired tank (Module T Task 1T).
3. Disconnect final drive (Module S Task 1S).
4. Replace headlight lamp (Module X Task 8X).
5. Replace taillight lamp (Module X Task 9X).

Training effectiveness can be established for each of the four kinds of tasks defined above. Transfer effectiveness cannot be established for DT tasks because safety and practical considerations preclude testing using the tank. Transfer effectiveness can be established for DT/XM1/MU tasks and DT/XM1 tasks and XM1 tasks.

Test Participants and Dates[1]

The test participants during OT II, and the dates of participation are as follows:

Position	Grade	Qual	Number	Inclusive Dates	Source
Instructors	E5/E6	19K	12	T-60 to T + 60	1st Tng Bde/Maint Dept
Trainees	E1/E2	19L	100	T to T + 60	1st Tng Bde
Tank Cmdrs (XM1)	E5/E6	19K	5	T to T + 60	1st Tng Bde
Drivers (XM1)	E4/E5	19L	5	T to T + 60	1st Tng Bde

Tasks for Training

The tasks for training are from two sources; the Sperry Secor procedure programs and HumRRO developed XM1 driver objectives. Figure 1 presents the Sperry tasks by procedure program display, while the HumRRO tasks by Module are given in Figure 2. The remainder of this section describes the procedures used to select the HumRRO tasks and develop the objectives.

[1]Author. Outline Test Plan, XM1 Driver Trainer. January 1979 and January 1980.

PROCEDURE PROGRAMS

PROGRAM 1: SYSTEMS INTRODUCTION 1

1 Warning and Caution Lights.
2 Hull Circuit Breakers.
3 Fuel System.
4 Exterior Lights.
5 Personnel Heater.

PROGRAM 2: SYSTEMS INTRODUCTION 2

6 Gas Particle Filter.
7 Transmission Shift Control.
8 Brake Controls.
9 Steering Throttle Control.
10 Night Vision Viewer.

PROGRAM 3: START UP/SHUT DOWN

11 Prepare Station/Power Up Hull.
12 Starting Engine.
13 After Start Checks.
14 Shut Down Engine.
15 Power Down Hull.
16 Secure Driver Station/After Operations Check.

PROGRAM 4: FIRE EXTINGUISHERS

17 Fire Extinguisher - Engine Compartment (Automatic).
18 Fire Extinguisher - Engine Compartment (Manual).
19 Fire Extinguisher - Crew Compartment (Automatic).
20 Fire Extinguisher - Crew Compartment (Manual).

PROGRAM 5: ENGINE START MALFUNCTIONS

41 Engine will not crank.
42 Engine cranks but will not start.
43 Engine cranks but aborts start.
44 Engine starts then shuts down.

PROGRAM 6: ENGINE SHUTDOWN MALFUNCTIONS

45 Engine will not shut down.
46 Engine stops turning too quickly after shutdown.
47 Engine idles too fast.

Figure 1. Sperry Sacor procedure programs display.

PROGRAM 7: LOSS OF ENGINE POWER

48 Loss of Power/Fuel Control Faulty Light.
49 Loss of Power/Fuel Control Faulty Light not lit.
50 Fuel Control Faulty Light/no loss of power.
51 Engine shuts down after momentary power loss.

PROGRAM 8: ENG/TRANS OIL MALFUNCTION

52 Engine Oil Temp High Warning Light.
53 Engine Oil Press Low Warning Light.
54 Engine Oil Low Caution Light.
55 Trans Oil Temp High Warning Light.
56 Trans Oil Press Low Warning Light.
57 Trans Oil Low Caution Light.
58 Trans Gear Shift Control CB.

PROGRAM 9: MISC WARN/CAUTION LIGHTS

59 Overspeed Warning Lights.
60 Engine Gas Overtemp Warning Light.
61 Low Battery Charge Caution Light.
62 Clogged Filter Caution Lights.
63 Master Panel Circuit Breaker.
64 Maintenance Monitor Circuit Breaker.
65 Low Fuel Level Light.

PROGRAM 10: MISC FUEL PUMP

66 Right Fuel Pump failure.
67 Transfer Pump failure.
68 Left Fuel Pump Circuit Breaker.

PROGRAM 11: EMERGENCY PROCEDURES 1

81 Engine failure.
82 Steering failure.
83 Brake failure.
84 Throttle failure.

PROGRAM 12: EMERGENCY PROCEDURES 2

85 Alternator failure.
86 Loss of Vehicle Track.
87 Cable disconnect.
88 Battery Cable disconnect.
89 Hydraulic Pump failure.

Figure 1. Sperry Secor procedure programs display (cont'd).

PROGRAM 21:

Basic Driving.
Forward and Reverse.
Turns Forward and Backward.
Pivot.
Driving Level Dirt Road at 15 MPH and 25 MPH.
Procedures:
  #21 Placing Tank in motion.
Malfunctions:
  (9) Clogged Air Filter.
  (8) Fuel Control faulty.
  (19) Trans Gear Shift CB pops.

PROGRAM 22:

Introduction to Convoy Driving.
Driving Steep, Curving Dirt Road at 20 MPH and 40 MPH.
Fording Deep Stream.
Obstacle.
Procedures:
  #22 Driving up and down hills.
  #32 Deep water fording.
  #23 Driving over obstacle.
Malfunctions:
  (18) Low fuel level.
  (12) Engine oil temp high.
  (3) Brake failure.

PROGRAM 23:

Driving Rough Dirt Road Over Numerous Ditches and Bumps.
Open Moderately Rough Terrain.
Procedures:
  #25 Smoke Generator.
Malfunctions:
  (20) Master Panel CB pops.
  (10) Engine Compartment fire.
  (4) Engine failure.
  (5) Fuel Pump failure.

PROGRAM 24:

Driving unimproved Dirt Road Over Numerous Ditches and Bumps
Steep Hills.
Stream Crossings.
Wooded Areas.
Moderately Rough Terrain
Malfunctions:
  (16) Engine Gas overtemp.
  (13) Engine Oil Press low.

Figure 1. Sperry Secor procedure programs display (cont'd).

PROGRAM 25:

Driving Very Rough Trails.
Moderately Hilly Terrain.
Muddy Areas.
Procedures:
  #24 Driving over ditch.
Malfunctions:
  (15) Trans Oil Pressure low.
  (14) Trans Oil Temp high.
  (11) Crew Compartment fire.
  (6) Alternator failure.

PROGRAM 26:

Fording Shallow Stream.
Driving Extremely Rough and Steep Terrain.
AVLB.
Muddy Areas.
Obstacles.
Procedures:
  #34 Skidding.
Malfunctions:
  (17) Engine overspeeds.
  (21) Maintenance monitor CB pops.

PROGRAM 27:

High Speed Driving on Hard Top Road.
Driving Extremely Rough Terrain Up and Down Very Steep Hills.
Obstacles.
Muddy Areas.
Procedures:
  #33 Reduced traction.
  #31 Fording shallow water.
Malfunctions:
  (1) Throttle failure.
  (2) Steering failure.
  (7) Thrown left track.

Figure 1. Sperry Secor procedure programs display (cont'd).

MODULE A: PREPARE DRIVER'S STATION FOR OPERATION

1A Enter Driver's Station.
2A Open Driver's hatch and adjust Driver's seat and periscope.
3A Check Turret Seal and Drain Valves.
4A Operate intercommunications equipment.
5A Perform before-operations maintenance checks and services on Driver's Station.

MODULE B: POWER UP HULL SYSTEMS

1B Check Driver's Master Panel Switches.
2B Test and adjust Driver compartment indicator lights and internal instrument lights.
3B Check Driver's instrument Panel Switches and gages.

MODULE C: START THE ENGINE

1C Start Engine-Normal Start.
2C Start Engine-Aborted Start.

MODULE D: MAKE AFTER-START CHECKS

1D Make after-start checks on engine.
2D Make after-start checks on warning and caution lights.
3D Make after-start checks on hydraulics.
4D Make after-start checks on brakes.

MODULE E: PLACE THE TANK IN MOTION

1E Place the tank in motion.
2E Steer the tank.
3E Brake the tank.

MODULE F: RESPOND TO WARNING AND CAUTION LIGHTS

1F Respond to MASTER CAUTION light.
2F Respond to LOW BAT CHARGE yellow caution light.
3F Respond to LOW FUEL LEVEL yellow caution light.
4F Respond to MASTER WARNING light.

MODULE G: OPERATE FIRE EXTINGUISHERS

1G Operate engine compartment fire extinguisher-automatic mode.
2G Operate engine compartment fire extinguisher-manual mode.
3G Operate crew compartment fire extinguisher-automatic mode.
4G Operate crew compartment fire extinguisher-manual mode.
5G Operate portable fire extinguishers.

MODULE H: OPERATE GAS PARTICULATE FILTER SYSTEM

1H Operate Gas Particulate Filter System.

Figure 2. HumRRO tasks by module.

MODULE I: OPERATE SMOKE GENERATOR

1I Operate Smoke Generator.

MODULE J: OPERATE PERSONNEL HEATER

1J Operate Personnel Heater - Fan only.
2J Operate Personnel Heater - Fan and Heater.

MODULE K: DRIVE TANK AT NIGHT

1K Operate Outside Lights.
2K Use Infrared Lenses.
3K Operate Driver's Night Vision Viewer.

MODULE L: SHUT DOWN ENGINE

1L Shut down engine.

MODULE M: POWER DOWN AND SECURE DRIVER'S STATION

1M Power down hull system.
2M Close Driver's hatch.
3M Exit Driver's station.

MODULE N: EMERGENCY PROCEDURES

1N Do immediate action for loss of engine power.
2N Do immediate action for loss of steering.
3N Do immediate action for loss of service brakes.
4N Remove injured crewmember through loader's hatch.
5N Decontaminate tank.
6N Do immediate action for throttle failure.

MODULE O: INSTALL THROWN TRACK

10 Walk track into position.
20 Prepare to install track.
30 Check suspension.
40 Install track support chain.
50 Get tank onto track.
60 Get tank drive sprocket.
70 Move track over idler wheel.
80 Remove track support chain.
90 Check track parts.

MODULE P: TROUBLESHOOT TANK ENGINE

1P Take action when engine does not crank.
2P Take action when engine cranks but does not start.
3P Take action when engine operates with reduced power.
4P Take action when engine shuts down automatically.
5P Take action when engine does not shut down.

Figure 2. HumRRO tasks by module (cont'd).

MODULE Q: DRIVE TANK

1Q Drive tank up and down hills.
2Q Drive tank over obsticles.
3Q Drive tank across ditches.

MODULE R: SLAVE START TANK

1R Prepare tanks.
2R Start dead tank.

MODULE S: TOW DISABLED TANK

1S Disconnect final drives.
2S Connect tow bar.
3S Tow tank with tow bar.
4S Disconnect tow bar.
5S Connect tow cables.
6S Tow tank with tow cables.
7S Disconnect tow cables.

MODULE T: RETRIEVE MIRED TANK

1T Retrieve mired tank.

MODULE U: DRIVE OVER UNUSUAL TERRAIN

1U Operate tank on snow or ice.
2U Operate tank on sand or mud.

MODULE V: CONDUCT SILENT WATCH

1V Complete Silent Watch Duty Cycle.

MODULE W: SHORT TRACKING

1W Complete short tracking.

MODULE X: PERFORM GENERAL MAINTENANCE

1X Release Track Tension.
2X Disconnect Track.
3X Connect Track.
4X Adjust Track Tension.
5X Open front fender.
6X Close front fender.
7X Replace front blackout marker lamp.
8X Replace headlight lamp.
9X Replace taillight lamp.
10X Refuel tank.

Figure 2. HumRRO tasks by module (cont'd).

MODULE Y: FORD SHALLOW WATER

1Y Ford shallow water.

MODULE Z: FORD DEEP WATER

1Z Install water fording kit items.
2Z Drive into water obstacle.
3Z Drive out of water obstacle.
4Z Prepare tank for operation after fording.

Figure 2. HumRRO tasks by module (cont'd).

The HumRRO tasks selected for training Drivers were identified from an analysis of the activities described for the Driver in DEP 9-2350-255-10-1, Operators Manual for Tank, Combat, Full-Tracked, 105-MM Gun, XM1, October 1978 with changes 1 and 2 and TM 9-2350-255-10, Operators Manual for Tank, Combat, Full-Tracked, 105-MM Gun, XM1, January 1980. After the tasks were identified they were grouped into functional areas (Modules) essentially matching their organization in the DEP/TM and arranged in a logical performance sequence. An objective, characterized by four parts, was written for each task. The four parts are:

1. Conditions/Stimulus
2. Action
3. Measurement
4. References

Conditions/Stimulus provides three items of information. First, the system state is described. System state information is the traditional "conditions" aspect of objectives and refers to any circumstances that might be expected to alter the quality or productivity of the task or activity that is to be performed. The system description for the beginning of task performance is referred to here but presented in tabular form for the task in each Module. The system state tables are included in Appendix B, HumRRO Developed Objectives for Training Program. Second, the location of the soldier when the task begins is specified; and finally, the stimulus for performing the task is described.

Action describes the responses to be measured, from which control requirements for testing devices may be inferred; and includes, as Notes, any information that will enhance task performance. There is a possibility that the procedures described have changed with design changes in the XM1. The procedures should be updated for the XM1 based on the current TM and actual hands-on verification during the instructor training phase for the OT. Then, during the developmental test, the procedures should be tried out and discrepancies noted. Any changes in the described procedures may require a change in the Measurement requirement for the task.

Measurement provides both an identification of the events between which time is to be measured (Time) and a description of how to assess the accuracy of the response of interest (Accuracy). Measurement specifications are presented for two stages of learning. First, during training when the principal concern, in terms of time, is that the soldier perform the task faster during successive performances until at the second stage, the end of training, the performance time meets the on-the job time requirement. The accuracy requirement during training is simply that the soldier perform the task exactly as described under Action. At the end of training, the requirement is essentially described as the product(s) of successful task performance. The reader is referred to Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement[1] for a thorough discussion of the measurement issue.

References indicates the documents and pages where the task description was found. For the most part, task descriptions came from either DEP 9-2350-255-10-1, October 1978 with Changes 1 and 2, or TM 9-2350-255-10, January 1980. A sample objective for the task, "Check turret seal and drain valves" is at Figure 3.

Training Design

The recommended training design for the three groups includes the sequences shown in Table 1. This design offers the best control during the OT II. In addition to the tests given after each of the twelve blocks of instruction given above, tests are given during training, after each task, module, or procedure program. Scores from the during training tests are used to derive measures of training effectiveness for each of the four kinds of tasks (DT.XM1/MU, DT/XM1,DT,XM1), for each the three groups (DT only, DT + XM1, XM1 + MU). The three groups permit examining all the training effectiveness and transfer issues addressed by the IEP. Measures also "fall out" of the training-testing sequences which permit assessing the substitutability of the mockup for the DT as medium for teaching both the DT and the DT/XM1/MU tasks. Modifications can easily be made to the training design if required by changes in the test concept. For example, testing of DT/XM1/MU tasks can be delayed until after DT/XM1 tasks are trained, at the cost of some

[1] Boldovici, J.A. Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement. Fort Knox, Kentucky: Human Resources Research Organization (HumRRO), Final Report 78-4, 1978.

TASK 3A: CHECK TURRET SEAL AND DRAIN VALVES

CONDITIONS/STIMULUS

System State: Table A, Column 3A.
Driver Location: In Driver's station.
Initiating Stimuli: Task 2A is complete.

ACTION

Driver will:

1. Check turret seal as follows:
   a. Check for zero pressure reading on turret inflatable seal pressure gage (located to Driver's left).

   NOTE A: If gage does now show zero pressure, bleed pressure by unscrewing bleed cock (located on seal pressure gage) until zero pressure is shown.

2. Check drain valves as follows:
   a. Check that drain valve handles (located to Driver's right side) are in open position.
   b. Open drain valve handles, if closed, by lifting handles to open notch.

   NOTE B: Have other personnel check under hull for leaks.

   c. Push drain valve handles to closed position.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 2.
Accuracy - As indicated by match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 2.
Accuracy - As indicated by:
- Zero reading on turret inflatable seal pressure gage.
- Driver's compartment drained with drain valve handles closed.

REFERENCES

TM 9-2350-255-10; p. 2-72.

Figure 3. Sample objective for check turret seal and drain values.

TABLE 1

TRAINING DESIGN

GROUP I (DT Only)	GROUP II (DT + XM1)	GROUP III (XM1 + MU)
(1.) Train DT/XM1/MU tasks on DT. Test DT/XM1/MU tasks on XM1.	(5.) Train DT/XM1/MU tasks on DT. Test DT/XM1/MU tasks on XM1.	(9.) Train DT/XM1/MU tasks on MU. Test DT/XM1/MU tasks on XM1.
(2.) Maneuver pretest.[1] Train DT/XM1 tasks on DT. Test DT/XM1 tasks on XM1. Posttest on XM1.	(6.) Maneuver pretest. Train DT/XM1 tasks on DT + XM1. Test DT/XM1 tasks on XM1. Posttest on XM1.	(10.) Maneuver pretest. Train DT/XM1 tasks on XM1. Test DT/XM1 tasks on XM1. Posttest on XM1.
(3.) Train DT tasks on DT. Test DT tasks on DT.	(7.) Train DT tasks on DT. Test DT tasks on DT.	(11.) Train DT tasks on MU. Test DT tasks on DT.
(4.) Train XM1 tasks in classroom with TM. Test XM1 tasks on XM1.	(8.) Train XM1 tasks on XM1. Test XM1 tasks on XM1.	(12.) Train XM1 tasks on XM1. Test XM1 tasks on XM1.

[1]Since most soldiers know how to drive automobiles, one cannot assume that the entry-level proficiency of driver trainees is zero. The concept of evaluation in the IEP calls for the use of pretests to establish entry proficiency levels. Soldiers cannot be pretested using tanks, so pretest media other than tanks are used. The pretest and posttest are described in Appendix A.

retention. DT only tasks can also be trained before DT/XM1 if that seems desirable; but, Group III will see the driver trainer much sooner. The training sequence is given in Table 2.

Training Materials

The tasks for training by task category (DT/XM1/MU), (DT/XM1), (DT), (XM1) are shown in Figures 4 through 7 and in Table 3. The training materials for the Sperry Secor procedure programs were developed by Sperry and are found elsewhere. The HumRRO developed objectives to be used in the training are presented in Appendix B by task category. Generally, for both Sperry Secor and HumRRO tasks, each soldier is remediated during training until he meets the accuracy standard for each task. Soldiers are tested, remediated, and retested, so by the end of training, all examinees will achieve final accuracy scores of 100 percent for each task. This test-remediation-retest procedure is to be used for training only. After training is complete, examinees will receive tests for the record, during which no prompting or remediation is to take place. Basic principles of and guidance for performance-oriented instruction are at Appendix C. The HumRRO developed objectives contain measurement specifications but not tests. Tests should be developed to go with the training and transfer testing using the guidance in Appendix D, Test Development. Among the assumptions made in the training plan design are that:

1. The soldiers to be trained will be naive with respect to the content of the training but will be in a 19L10-OSUT BAT program.
2. Four instructors will be available for every 30-33 soldiers with the instructors sharing teaching and testing responsibilities.
3. Training is to be conducted for three groups of 30-33 soldiers each, as follows:

   Group I: Driver trainer only (soldiers do not get into an XM1 tank until they are (transfer) tested.

   Group II: Driver trainer supplemented by XM1 tank.

   Group III: XM1 tank supplemented by a wooden mockup to be built by TASC.

TABLE 2

TRAINING SEQUENCE BY GROUP BY BLOCK OF INSTRUCTION

GROUP I (DT Only)	GROUP II (DT + XM1)	GROUP III (XM1 + MU)
(1.) Train: Sperry Program on DT. Test: Sperry tasks (using HumRRO objectives) on XM1.	(5.) Train: Sperry Program on DT. Test: Sperry tasks (using HumRRO objectives) on XM1.	(9.) Train: Sperry Program materials on MU. Talk through procedures. Soldier responds by repeating orally and taking any actions allowed by the MU design. Test: Sperry tasks (using HumRRO objectives) on XM1.
(2.) Maneuver Pretest. Train: Sperry Program on DT. Test: Sperry tasks (using HumRRO objectives) on XM1. Posttest.	(6.) Maneuver Pretest. Train: Sperry Program on DT. When mastery is reached, train on corresponding HumRRO tasks. Test: On Sperry tasks and HumRRO tasks on XM1. Posttest.	(10.) Maneuver Pretest. Train: HumRRO objectives on XM1 Test: HumRRO objectives on XM1. Posttest
(3.) Train: Sperry Program on DT. Test: Sperry Program on DT.	(7.) Train: Sperry Program on DT. Test: Sperry Program on DT.	(11.) Train: Sperry Program materials on MU. Talk through procedures. Soldier responds by repeating procedures orally and taking any actions allowed by the MU design. Test: Sperry Program on DT.
(4.) Train: HumRRO XM1 tasks.[1] Test: HumRRO tasks on XM1.	(8.) Train: HumRRO tasks on XM1. Test: HumRRO tasks on XM1.	(12.) Train: HumRRO tasks on XM1. Test: HumRRO tasks on XM1.

[1]Training is done in classroom using TM and other manuals.

DT/XM1/MU TASKS

Sperry Secor Tasks

Program 1 (Systems Introduction 1)

1 Warning and caution lights
2 Hull circuit breakers
3 Fuel system
4 Exterior lights
5 Personnel heater

Program 2 (Systems Introduction 2)

6 Gas particle filter
7 Transmission shift control
8 Brake controls
9 Steering throttle control
10 Night vision viewer

Program 3 (Start Up/Shut Down)

11 Prepare station/power up hull
12 Starting engine
13 After start checks
14 Shut down engine
15 Power down hull
16 Secure driver station/after operations check

Program 4 (Fire Extinguishers)

17 Fire extinguisher - engine compartment (automatic)
18 Fire extinguisher - engine compartment (manual)
19 Fire extinguisher - crew compartment (automatic)
20 Fire extinguisher - crew compartment (manual)

Program 11 (Emergency Procedures 1)

81 Engine failure
82 Steering failure
83 Brake failure
84 Throttle failure

HumRRO Tasks

Module A: Prepare Driver's Station for Operation

4A Operate intercommunications equipment
5A Perform before-operations maintenance checks and services on

Figure 4. Tasks for training by DT/XM1/MU task category.

Module B: Power Up Hull Systems

1B Check driver's master panel switches
2B Test and adjust driver compartment indicator lights and internal instrument lights
3B Check driver's instrument panel switches and gages

Module C: Start the Engine

1C Start engine-normal start

Module D: Make After-Start Checks

1D Make after-start checks on engine
2D Make after-start checks on warning and caution lights
3D Make after-start checks on hydraulics
4D Make after-start checks on brakes

Module F: Respond To Warning and Caution Lights

1F Respond to MASTER CAUTION light
2F Respond to LOW BAT CHARGE yellow caution light
3F Respond to LOW FUEL LEVEL yellow caution light
4F Respond to MASTER WARNING light

Module G: Operate Fire Extinguishers

1G Operate engine compartment fire extinguisher-automatic mode
2G Operate engine compartment fire extinguisher-manual mode
3G Operate crew compartment fire extinguisher-automatic mode
4G Operate crew compartment fire extinguisher-manual mode

Module H: Operate Gas Particulate Filter System

1H Operate gas particulate filter system

Module J: Operate Personnel Heater

1J Operate personnel heater - fan only
2J Operate personnel heater - fan and heater

Module K: Drive Tank at Night

1K Operate outside lights
3K Operate driver's night vision viewer

Figure 4. Tasks for training by DT/XM1/MU task category (cont'd.).

Module L: Shut Down Engine

1L Shut down engine

Module M: Power Down and Secure Driver's Station

1M Power down hull system

Module N: Conduct Emergency Procedures

1N Do immediate action for loss of engine power
2N Do immediate action for loss of steering
3N Do immediate action for loss of service brakes
6N Do immediate action for throttle failure

Figure 4. Tasks for training by DT/XM1/MU task category (Cont'd.).

DT/XM1 TASKS

Sperry Secor Tasks

Program 12 (Emergency Procedures 2)

86 Loss of vehicle track

Program 21

Basic driving
Forward and reverse
Turns forward and backward
Pivot
Driving level dirt road at 15 mph and 25 mph
Procedures:
#21 Placing tank in motion

Program 22

Introduction to convoy driving
Driving steep, curving dirt road at 20 mph and 40 mph
Fording deep stream
Obstacle
Procedures:
#22 Driving up and down hills
#32 Deep water fording
#23 Driving over obstacle

Program 23

Driving rough dirt road over numerous ditches and bumps
Open moderately rough terrain
Procedures:
#25 Smoke generator

Program 24

Driving unimproved dirt road over numerous ditches and bumps
Steep hills
Stream crossings
Wooded areas
Moderately rough terrain

Figure 5. Tasks for training by DT/XM1 category.

Program 25

Driving very rough trails
Moderately hilly terrain
Muddy areas
Procedures:
#24 Driving over ditch

Program 26

Fording shallow stream
Driving extremely rough and steep terrain
AVLB
Muddy areas
Obstacles
Procedures:
#34 Skidding

Program 27

High speed driving on hard top road
Driving extremely rough terrain up and down very steep hills
Obstacles
Muddy areas
Procedures:
#33 Reduced traction
#31 Fording shallow water

HumRRO Tasks

Module E: Place the Tank in Motion

1E Place the tank in motion
2E Steer the tank
3E Brake the tank

Module I: Operate Smoke Generator

II Operate smoke generator

Module O: Install Thrown Track

10 Walk track into position
20 Prepare to install track
30 Check suspension
40 Install track support chain
50 Get tank onto track
60 Get tank drive sprocket
70 Move track over idler wheel
80 Remove track support chain
90 Check track parts

Figure 5. Tasks for training by DT/XM1 category (cont'd.).

Module Q: Drive Tank

1Q Drive tank up and down hills
2Q Drive tank over obstacles
3Q Drive tank across ditches

Module U: Driver Over Unusual Terrain

2U Operate tank on sand or mud

Module Y: Ford Shallow Water

1Y Ford shallow water

Figure 5. Tasks for training by DT/XM1 category (cont'd.).

DT TASKS

Sperry/Secor Tasks

Program 5 (Engine Start Malfunctions)

41 Engine will not crank
42 Engine cranks but will not start
43 Engine cranks but aborts start
44 Engine starts then shuts down

Program 6 (Engine Shutdown Malfunctions)

45 Engine will not shut down
46 Engine stops turning too quickly after shutdown
47 Engine idles too fast

Program 7 (Loss of Engine Power)

48 Loss of power/fuel control faulty light
49 Loss of power/fuel control faulty light not lit
50 Fuel control faulty light/no loss of power
51 Engine shuts down after momentary power loss

Program 8 (Eng/Trans Oil Malf)

52 Engine oil temp high warning light
53 Engine oil press low warning light
54 Engine oil low caution light
55 Trans oil temp high warning light
56 Trans oil press low warning light
57 Trans oil low caution light
58 Trans gear shift control CB

Program 9 (Misc Warn/Caution Lights)

59 Overspeed warning lights
60 Engine gas overtemp warning light
61 Low battery charge caution light
62 Clogged filter caution lights
63 Master panel circuit breaker
64 Maintenance monitor circuit breaker
65 Low fuel level light

Program 10 (Misc Fuel Pump)

66 Right fuel pump failure
67 Transfer pump failure
68 Left fuel pump circuit breaker

Figure 6. Tasks for training by DT category.

Program 12 (Emergency Procedures 2)

85 Alternator failure
87 Cable disconnect
88 Battery cable disconnect
89 Hydraulic pump failure

Program 21 (Basic Driving)

Malfunction (9) Clogged air filter
(8) Fuel control faulty
(19) Trans gear shift CB pops

Program 22 (Introduction To Convoy Driving)

Malfunction (18) Low fuel level
(12) Engine oil temp high
(3) Brake failure

Program 23 (Driving Rough Dirt Road)

Malfunction (20) Master panel CB pops
(10) Engine compartment
(4) Engine failure
(5) Fuel pump failure

Program 24 (Driving Unimproved Dirt Road)

Malfunction (16) Engine gas overtemp
(13) Engine oil press low

Program 25 (Driving Very Rough Trails)

Malfunction (15) Trans oil pressure low
(14) Trans oil temp high
(11) Crew compartment fire
(6) Alternator failure

Figure 6. Tasks for training by DT category (con't.).

Program 26 (Fording/Rough Terrain)

Malfunction	(17)	Engine overspeeds
	(21)	Maintenance monitor CB pops

Program 27 (High Speed Driving)

Malfunction	(1)	Throttle failure
	(2)	Steering failure
	(7)	Thrown left track

Figure 6. Tasks for training by DT category (cont'd.).

XM1 TASKS

HumRRO Tasks

Module A: Prepare Driver's Station for Operation

1A Enter driver's station
2A Open driver's hatch and adjust driver's seat and periscope
3A Check turret seal and drain valves

Module C: Start the Engine

2C Start engine-aborted start

Module G: Operate Fire Extinguishers

5G Operate portable fire extinguishers

Module K: Drive Tank At Night

2K Use infrared lenses

Module M: Power Down and Secure Driver's Station

2M Close driver's hatch
3M Exit driver's station

Module N: Conduct Emergency Procedures

4N Remove injured crewmember through loader's hatch
5N Decontaminate tank

Module P: Troubleshoot Tank Engine

1P Take action when engine does not crank
2P Take action when engine cranks but does not start
3P Take action when engine operates with reduced power
4P Take action when engine shuts down automatically
5P Take action when engine does not shut down

Module R: Slave Start Tank

1R Prepare tanks
2R Start dead tank

Module S: Tow Disabled Tank

1S Disconnect final drives
2S Connect tow bar
3S Tow tank with tow bar
4S Disconnect tow bar
5S Connect tow cables
6S Tow tank with tow calbes
7S Disconnect tow cables

Figure 7. Tasks for training by XM1 category

Module T: Retrieve Mired Tank

1T: Retrieve mired tank

Module U: Drive Over Unusual Terrain

1U Operate tank on snow or ice

Module V: Conduct Silent Watch

1V Complete Silent Watch Duty Cycle

Module W: Short Tracking

1W Complete short tracking

Module X: Perform General Maintenance

1X Release track tension
2X Disconnect Track
3X Connect Track
4X Adjust track tension
5X Open front fender
6X Close front fender
7X Replace front blackout marker lamp
8X Replace headlight lamp
9X Replace taillight lamp
10X Refuel tank

Module Z: Ford Deep Water

1Z Install water fording kit items
2Z Drive into water obstacle
3Z Drive out of water
4Z Prepare tank for operation after fording

Figure 7. Tasks for training by XM1 category (cont'd.).

TABLE 3

PROGRAM-PROCEDURE/MODULE-TASK NUMBERS TRAINED AND TESTED IN EACH BLOCK

GROUP I (DT Only)	GROUP II (DT + XM1)	GROUP III (XM1 + MU)
①	⑤	⑨
1.1[a] (4A)(5A)(1B)(2B)(3B)(1F)(2F)(3F)	1.1[a] (4A)(5A)(1B)(2B)(3B)(1F)(2F)(3F)	1.1[a] (4A)(5A)(1B)(2B)(3B)(1F)(2F)(3F)
1.2 (4A)(5A)(1B)(2B)(3B)(2F)	1.2 (4A)(5A)(1B)(2B)(3B)(2F)	1.2 (4A)(5A)(1B)(2B)(3B)(2F)
1.3 (4A)(5A)(1B)(2B)(3B)(3F)	1.3 (4A)(5A)(1B)(2B)(3B)(3F)	1.3 (4A)(5A)(1B)(2B)(3B)(3F)
1.4 (4A)(5A)(1B)(2B)(3B)	1.4 (4A)(5A)(1B)(2B)(3B)	1.4 (4A)(5A)(1B)(2B)(3B)
1.5 (4A)(5A)(1B)(2B)(3B)(1J)(2J)	1.5 (4A)(5A)(1B)(2B)(3B)(1J)(2J)	1.5 (4A)(5A)(1B)(2B)(3B)(1J)(2J)
2.6 (1H)	2.6 (1H)	2.6 (1H)
2.7 (5A)	2.7 (5A)	2.7 (5A)
2.8 (5A)	2.8 (5A)	2.8 (5A)
2.9 (5A)	2.9 (5A)	2.9 (5A)
2.10 (1K)(3K)	2.10 (1K)(3K)	2.10 (1K)(3K)
3.11 (4A)(5A)	3.11 (4A)(5A)	3.11 (4A)(5A)
3.12 (1C)	3.12 (1C)	3.12 (1C)
3.13 (1D)(2D)(3D)(4D)	3.13 (1D)(2D)(3D)(4D)	3.13 (1D)(2D)(3D)(4D)
3.14 (1L)	3.14 (1L)	3.14 (1L)
3.15 (1M)	3.15 (1M)	3.15 (1M)
3.16 (1M)	3.16 (1M)	3.16 (1M)
4.17 (1G)	4.17 (1G)	4.17 (1G)
4.18 (2G)	4.18 (2G)	4.18 (2G)
4.19 (3G)	4.19 (3G)	4.19 (3G)
4.20 (4G)	4.20 (4G)	4.20 (4G)
11.81 (1N)	11.81 (1N)	11.81 (1N)
11.82 (2N)	11.82 (2N)	11.82 (2N)
11.83 (3N)	11.83 (3N)	11.83 (3N)
11.84 (6N)	11.84 (6N)	11.84 (6N)
②	⑥	⑩
12.86 (10)(20)(30)(40)(50)(60)(70)(80)(90)	12.86 (10(20)(30)(40)(50)(60)(70)(80)(90)	10,20,30,40,50,60,70,80,90
21.21 (1E)(2E)(3E)	21.21 (1E)(2E)(3E)	IE,2E,3E
		1I

[a]The number/number designation refers to Sperry Secor Program Procedure numbers, the letter/number designation refers to HumRRO modules and tasks.

TABLE 3 (Cont'd.)

GROUP I (DT Only)	GROUP II (DT + XM1)	GROUP III (XM1 + MU)
② (Cont'd.) 22.22, 22.32, 22.23 (1E)(2E)(3E)(1Q)(2Q) 23.25 (1E)(2E)(3E)(1I)(3Q) 24 (1E)(2E)(3E)(1Q)(3Q) 25.24 (1E)(2E)(3E)(1Q)(3Q)(2U) 26.34 (1E)(2E)(3E)(1Q)(2Q)(2U)(1Y) 27.33, 27.31 (1E)(2E)(3E)(1Q)(2Q)(2U)(1Y)	⑥ (Cont'd.) 22.23, 22.32, 22.23 (1E)(2E)(3E)(1Q)(2Q) 23.25 (1E)(2E)(3E)(1I)(3Q) 24 (1E)(2E)(3E)(1Q)(3Q) 25.24 (1E)(2E)(3E)(1Q)(3Q)(2U) 26.34 (1E)(2E)(3E)(1Q)(2Q)(2U)(1Y) 27.33, 27.31 (1E)(2E)(3E)(1Q)(2Q)(2U)(1Y) **NOTE: Train and test on all procedures/tasks in this block.**	⑩ (Cont'd.) 1Q,2Q,3Q 2U 1Y
③ 5.41,5.42,5.43,5.44 6.45,6.46,6.47 7.48,7.49,7.50,7.51 8.52,8.53,8.54,8.55,8.56,8.57,8.58 9.59,9.60,9.61,9.62,9.63,9.64,9.65 10.66,10.67,10.68 12.85,12.87,12.88,12.89 21.9, 21.8,21.19 22.18,22.12,22.3 23.20,23.10,23.4,23.5 24.16,24.13 25.15,25.14,25.11,25.6 26.17,26.21 27.1,27.2,27.7	⑦ 5.41,5.42,5.43,5.44 6.45,6.46,6.47 7.48,7.49,7.50,7.51 8.52,8.53,8.54,8.55,8.56,8.57,8.58 9.59,9.60,9.61,9.62,9.63,9.64,9.65 10.66, 10.67, 10.68 12.85,12.87,12.88,12.89 21.9,21.8,21.19 22.18,22.12,22.3 23.20,23.10,23.4,23.5 24.16,24.13 25.15,25.14,25.11,25.6 26.17,26.21 27.1,27.2,27.7	⑪ 5.41,5.42,5.43,5.44 6.45,6.46,6.47 7.48,7.49,7.50,7.51 8.52,8.53,8.54,8.55,8.56,8.57,8.58 9.59,9.60,9.61,9.62,9.63,9.64,9.65 10.66,10.67,10.68 12.85,12.87,12.88,12.89 21.9,21.8,21.19 22.18,22.12,22.3 23.20,23.10,23.4,23.5 24.16,24.13 25.15,25.14,25.11,25.6 26.17,26.21 27.1,27.2,27.7
④ 1A,2A,3A 2C 5G 2K	⑧ 1A,2A,3A 2C 5G 2K	⑫ 1A,2A,3A 2C 5G 2K

TABLE 3 (Cont'd.)

GROUP I (DT Only)	GROUP II (DT + XM1)	GROUP III (XM1 + MU)
④ (Cont'd.)	⑧ (Cont'd.)	⑫ (Cont'd.)
2M,3M	2M,3M	2M,3M
4N,5N	4N,5N	4N,5N
1P,2P,3P,4P,5P	1P,2P,3P,4P,5P	1P,2P,3P,4P,5P
1R,2R	1R,2R	1R,2R
1S,2S,3S,4S,5S,6S,7S	1S,2S,3S,4S,5S,6S,7S	1S,2S,3S,4S,5S,6S,7S
1T	1T	1T
1U	1U	1U
1V	1V	1V
1W	1W	1W
1X,2X,3X,4X,5X,6X,7X,8X,9X,10X	1X,2X,3X,4X,5X,6X,7X,8X,9X,10X	1X,2X,3X,4X,5X,6X,7X,8X,9X,10X
1Z,2Z,3Z,4Z	1Z,2Z,3Z,4Z	1Z,2Z,3Z,4Z

NOTE: In blocks ①, ②, ⑤, and ⑨, soldiers are trained on the Sperry Secor material and tested (for transfer effectiveness) on the corresponding HumRRO tasks. In block ⑥, soldiers are trained on Sperry Secor material, then on the corresponding HumRRO tasks; then tested (for transfer effectiveness) on HumRRO tasks.

Lesson Plans

A lesson plan must be developed for each of the 12 blocks of instruction[1] described for the training design sequence (see Table 1). Each lesson plan is written for the entire block and should include as a minimum the following sections:

A. Training Objective for the block of instruction to include the task, conditions, and standard.

B. Administrative Instructions for conducting the training.

C. Sequence for conducting the training and testing. The sequence differs depending on the group.

D. Safety Instructions for the block of instruction. Any specific, non-traditional safety requirements should be described.

E. Additional Comments and Information specific to the block of instruction or any task(s) in the block of instruction.

A sample lesson plan outline (Lesson Plan 4) for block of instruction 6 (Train DT/XM1 tasks on DT + XM1) is at Figure 8.

[1]Since some blocks of instruction are identical, only eight lesson plans need be developed, as follows:

Lesson Plan 1	Blocks 1 and 5	Lesson Plan 5	Blocks 3 and 7
Lesson Plan 2	Block 9	Lesson Plan 6	Block 11
Lesson Plan 3	Blocks 2 and 10	Lesson Plan 7	Block 4
Lesson Plan 4	Block 6	Lesson Plan 8	Blocks 8 and 12

Table 2 is useful in planning the lessons.

LESSON PLAN OUTLINE

INSTRUCTION BLOCK 6
DT/XM1 TASKS ON DT + XM1

A. TRAINING OBJECTIVE

TASK: Each soldier will meet the during training and end of training standard for the Sperry Secor tasks and the HumRRO tasks for the block of instruction.

CONDITIONS: As described in the Sperry Secor procedure programs and the CONDITIONS/STIMULUS part of each HumRRO task.

STANDARD: For Sperry Secor tasks the during training standard is 100% mastery of each procedure. The end of training standard is as described in the programs.

For HumRRO tasks the standards are as described under MEASUREMENT for each task.

B. ADMINISTRATIVE INSTRUCTIONS

1. When training will be given:
2. Training location:
3. Who will be trained:
4. Principal and assistant instructors:
5. Equipment and materials:

C. SEQUENCE

1. State training objective and reason for learning the tasks.
2. Conduct training on Sperry Secor program. When mastery is achieved on Sperry Secor (Mastery as defined by Sperry Secor procedure programs) conduct training on corresponding HumRRO tasks.
3. Test soldiers individually. If a soldier cannot perform a step of a task, you may show him how to perform the step, and continue the test or have the soldier go practice or study. Before the soldier can be signed off on a task, he must perform the test with no prompting.

D. SAFETY INSTRUCTIONS

1. Use ground guides when moving tanks in assembly area.
2. Driver must be in tank when engine is running.

E. ADDITIONAL COMMENTS AND INFORMATION

Since tasks in this block of instruction include only normal driving, the Sperry Secor procedure programs have to be modified to allow separating the normal procedures from the malfunction procedures. This can be arranged by preparing prerecorded modifications with the malfunctions cancelled or cut off. All malfunction procedures will be trained in blocks 3, 7, and 11 for Groups I, II, and III, respectively.

Figure 8. Sample lesson plan for block of instruction 6 (Train DT/XM1 tasks on DT + XM1).

The Measurement part for each HumRRO task identifies the start and stop points for measuring time and describes how to assess the accuracy of performance. Measurement specifications are presented for two stages of learning. During the first stage, training, time is the principal concern. The soldier should perform the task faster during successive performances, until at the second stage, the end of training, the performance time meets the on-the-job time requirement. The accuracy requirement during training is simply that the soldier perform the task exactly as described under Driver Will. Measurement at the end of training will focus on products of successful task performance whenever such a focus is practical. A thorough discussion of the measurement issue is in Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement.[1]

The procedures described under Driver Will for each task are derived from DEP 9-2350-255-10-1, Operator's Manual for Tank, Combat, Full-Tracked, 105 MM Gun, XM1, October 1978, with changes 1 and 2 and TM 9-2350-255-10, Operator's Manual for Tank, Combat, Full-Tracked, 105 MM Gun, XM1, January 1980. There is a possibility that the procedures have changed with design changes in the XM1. The procedures should be updated for the XM1 based on current TMs and actual hands-on verification during the instructor training phase for the OT. Then, during the developmental test, the procedures for each task should be tried out and discrepancies noted. Any changes in the described procedures may require a change in the MEASUREMENT requirement for the task.

Figure 8 (Cont'd.). Sample lesson plan outline for block of instruction 6 (Train DT/XM1 tasks on DT + XM1).

[1]Boldovici, J.A. Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement. Fort Knox, Kentucky: Human Resources Research Organization (HumRRO), Final Report 78-4, 1978.

CHAPTER TWO

DATA REQUIREMENTS

In order to evaluate the XM1 driver training program, data are needed in three areas:

- Training Resource Requirements (Issue 2.1.3)
- Manuever Pretest
- Transfer Effectiveness (Issue 2.1.2)

Training effectiveness (Issue 2.1.1) is evaluated by means of data collected for training resource requirements, on the Soldier Training Reports.

Training Resource Requirements

This information will be used to estimate the cost of developing and implementing each of the three alternative training programs. The forms provided in Appendix E should be used to report the information. Explanations of the entries required for each form are as follows.

Personnel Requirements. This form should be completed for each person involved in setting up or running any part of the XM1 driver training program. Give the person's name, rank/grade, and primary MOS. Then for each function in which the person was involved (Planning, Development, Conduct, and/or Evaluation) and each training group for which the person performed that function (Group I, II, and/or III), place a P (Primary) or S (Support) in the column headed "Role" to indicate the person's responsibilities. In the column headed "Time," indicate the number of hours the person spent on that function/training group/role.

The functions are defined as follows:

- Planning - scheduling, determining requirements for and obtaining personnel and equipment, logistics, etc.
- Development - writing and review of lesson plans, test materials, etc.
- Conduct - actual training and testing time during implementation.
- Evaluation - pre-training testing and transfer study testing.

The three training groups are as defined earlier.

Primary role means that the person directed or was responsible for major portions of the work in a given function. Secondary role means that the person assisted or was under the supervision of someone in a primary role. If the person was not involved in a function for a training group, the corresponding lines in the "Role" and "Time" columns should be left blank.

It is possible that there will be overlap between training groups for a given function. For example, some tests developed for use on the XM1 will be used for both Group II and Group III. In such a case, the hours would be recorded for both Group II and Group III, and a note attached explaining that those hours are recorded in two places. In this way, it will be possible to determine what the personnel requirements would have been to develop and implement any one of the three training alternatives alone.

Vehicle Use. For each of the three training groups, records should be kept of vehicle requirements. For any vehicle used, the information to be recorded includes vehicle type and number, the time, date and mileage when the vehicle is picked up and when it is turned in, the actual time that the vehicle is used, and the block(s) of training/testing for which the vehicle is required. The blocks of training/testing for which vehicles may be required are:

- Pre-training Manuever Test (all Training Groups)
- Blocks 1,5,9 Transfer Study (all Training Groups)
- Blocks 6,10 Training (Groups II and III)
- Blocks 2,6,10 Transfer Study (all Training Groups)
- Blocks 8,12 Training (Groups II and III)
- Blocks 4,8,12 Transfer Study (all Training Groups)

Equipment Use. For each of the three training groups, records should be kept of equipment requirements. For any equipment item (e.g., tools, fuels, TM, paper) needed, the information to be recorded includes type and quantity of equipment, whether or not items are expended, and the module(s) or tasks(s) for which the equipment item is needed.

Soldier Training Report. The training resource data needed include the time and number of tries required by soldiers in each training group to master each program or module. Separate forms are provided for soldiers in Groups I, II, and III. These data also form the basis of the evaluation of training effectiveness.

For tasks trained on the Driver Trainer, the soldier will practice a program with audio instruction until he and the instructor feel he is proficient. The soldier will then attempt the program without audio instructions. If he performs to the predetermined standard, he has completed the program. If he does not perform to the standard, he will practice the program as the instructor directs, and may try again without audio instruction after practice. He is allowed as many tries and as much practice as necessary until he performs the program to the standard without audio instruction. He should not begin training on another program until he completes the program already started.

For each program trained on the Driver Trainer, the instructor should record the time the soldier spends in training. [It should not be difficult for Sperry Secor to program the computer so that a soldier's printout includes the time when he signs on the Driver Station, the time when he passes each program, and the time when he leaves the Driver Station. Then if the instructor insures that the soldier passes the program before going on to the next program, the time spent on a program can be computed easily from printouts. Otherwise, the instructor has to monitor the soldier's progress in process, writing down all the times as the soldier moves between programs.] The time spent on a program is defined as the total amount of time, in hours and minutes, from when the soldier first begins training on the program until he completes the program without audio instruction to the predetermined performance standard. [Both time spent and] number of tries may be determined from the scoring printouts obtained each time the soldier leaves the Driver Station. These printouts should be maintained with the Soldier Training Report.

For tasks trained on the XM1 tank or tank mockup, the date and time when the instructor first begins the training of a task, and the date and time when the soldier performs the task to the training standard with no prompts, will define the time spent on the task. The soldier will make as many tries at the task as necessary with prompts and additional

practice as required until he can perform with no prompts. The total number of tries should be recorded.

For tasks trained on the Driver Trainer and the XM1 tank (Block 5), the time and number of tries on each, as defined above, should both be recorded.

For tasks trained in the classroom (Block 4), the date and time when instruction begins and when the soldier passes the test of the material should be recorded. The soldier is allowed to take tests more than once, if necessary. Feedback should focus on additional instruction needed by the soldier rather than on specific test items and correct answers. The total number of tries of each test should also be recorded.

Maneuver Pretest

The maneuver pretest is administered to all soldiers before they begin their second block of training, Normal Driving. Scores are obtained as described in Appendix A, and should be recorded on the Soldier Training Report.

Transfer Effectiveness

At the conclusion of each block of training, tests of all three training groups will be conducted on the tasks covered in that block. These tests are conducted with no prompts, and the soldier is allowed only one try. For tests conducted on the Driver Trainer, the soldier's scoring printout should be attached to his Transfer Testing Record. For tests conducted on the XM1 tank, the test scoresheet should be attached to the soldier's Transfer Testing Record. For all tests, the final result (Pass/Fail) should be recorded on the soldier's Transfer Testing Record, along with the soldier's name and training group.

APPENDIX A

PRETEST AND POSTTEST

Pretest Guidance

- Soldiers will drive a wheeled vehicle with automatic transmission.
- Course should be laid out on a parking lot approximately 650 feet long.
- Place ten markers approximately 60 feet apart in a straight line.
- Require soldier to drive wheeled vehicle along the line of markers as rapidly as possible, passing the markers alternately on the right and left sides.
- Soldier will negotiate course three times.
- Score an error (Hit/Miss) for each marker "contacted" by the vehicle or each marker not alternately passed, or both, for each time on the course.
- Record total time taken to pass the markers each time on the course.
- Average errors and time.
- See Figure A1 for Scoring Instructions and Figure A2 for Scoresheet.

Posttest Guidance

- Use test scores from end-of-block test (Blocks of Instruction, 2, 6 and 10).

Pretest

Instructions for Scorers

1. There will be two scorers for the exercise.
2. Each scorer will have a hand signal flag, pencils, and copies of his Score Sheet. In addition, scorer #2 will have a stopwatch.
3. The vehicles will be halted by scorer #1 at a previously marked position 50 feet from the first marker.
4. Scorer #1 will say to the "driver": "Your vehicle will move through this course as fast as possible, passing to the right of the first marker, to the left of the second one, and so on, zigzaging until you have passed all of the markers. Go as fast as you can, but don't hit any of the markers. I will move up to the starting line now. When you see me raise the flag, move out. After you pass the last marker, proceed according to your instructions. Remember--drive as fast as you can, without hitting a marker."
5. Scorer #1 will then move to the previously marked starting line, and position himself so that he can easily see when the vehicle passes the starting line.
6. Scorer #2 will stand near the sixth marker in such a position that he can easily see the flag held by Scorer #1, and raise his flag above his head to signal that he is ready.
7. When Scorer #1 sees that Scorer #2 is ready, he will raise the signal flag above his head, and the vehicle will move toward the starting line.
8. As soon as the vehicle reaches the starting line, Scorer #1 will bring down the signal flag and will move with the vehicle past the first five markers, marking with a check (✓) the blank under either "Hit" or "Miss" on the score sheet, as appropriate, for each of the first five markers.
9. As soon as the vehicle has passed the fifth marker, Scorer #1 willreturn to the position where the other vehicles are parked, mount the next vehicle, and wait for the signal that Scorer #2 is ready again.
10. As soon as Scorer #1 lowers the signal flag, Scorer #2 will start the stopwatch and lower his flag.
11. Scorer #2 will move with the vehicle past the last five markers, marking the score sheet appropriately, as did Scorer #1.
12. As soon as the vehicle reaches the previously marked finish line, Scorer #2 will stop the watch and record the time to the nearest second in the blank space in item #2, "Time: (Secs.)" on the Score Sheet.
13. Scorer #2 will then return to his original position near the sixth marker, reset his watch at "0", and signal Scorer #1 that he is ready by raising his flag.
14. The above procedure will be followed until all "drivers" have completed the exercise three times.
15. If a vehicle fails to pass a marker (or markers) on the correct side, that/those marker/s will be shown as "Hit" on the Score Sheet, and the information will be recorded in the "Remarks" section.

Figure A1. Scoring instructions for pretest.

PRETEST SCORESHEET

Date _____

Soldier: _____

Scorer #1

Marker #	Run 1 Hit	Run 1 Miss	Run 2 Hit	Run 2 Miss	Run 3 Hit	Run 3 Miss
1						
2						
3						
4						
5						

Remarks:

Scorer: _____

Scorer #2

Marker #	Run 1 Hit	Run 1 Miss	Run 2 Hit	Run 2 Miss	Run 3 Hit	Run 3 Miss
6						
7						
8						
9						
10						
Time (Secs.)						

Remarks:

Scorer: _____

Average Errors: _____

Average time: _____

Figure A2. Scoresheet for pretest.

APPENDIX B

HUMRRO DEVELOPED OBJECTIVES FOR TRAINING PROGRAM

The HumRRO developed objectives in this Appendix are organized by task category and the Tables referenced in the objective are provided at the end of the Appendix. The material in the Appendix is organized as follows:

HUMRRO OBJECTIVES FOR DT/XM1/MU TASKS

TASK 4A: OPERATE INTERCOMMUNICATIONS EQUIPMENT

CONDITIONS/STIMULUS

System State: Table A, Column 4A; and an operational radio intercommunications system, Driver and TC CVC helmets, a predtermined frequency set on the radio.

Driver Location: In Driver's station.

Initiating Stimuli: Task 3A is completed.

ACTION

Driver will:

1. Turn VEHICLE MASTER Power switch on Driver's master panel (located to right of driver) ON by pulling switch out and raising to on position.
2. Check that VEHICLE MASTER Power light on Driver's master panel comes on.
3. Release VEHICLE MASTER Power Switch.

NOTE A: Switch returns to center position.

4. Tell Loader to turn ON amplifier AM 1780/VRC.
5. Place CVC helmet on head.
6. Connect helmet cable to intercom box connector (located to the right of Driver's seat).
7. Turn monitor switch lever to INT ONLY.
8. Press button on steer-throttle control to talk to tank commander.
9. Release button to hear crewmembers report.
10. Adjust volume as necessary with volume knob.

NOTE B: Driver can adjust monitor lever as required.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 10.

Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:

Time - Between end of initiating stimuli and and completion of Step 10.

Accuracy - As indicated by Driver establishing communications with other crewmember(s).

REFERENCES

DEP 9-2350-255-10-1: p. 2-65, p. 2-198 and 2-199.

TASK 5A: PERFORM BEFORE-OPERATIONS MAINTAINANCE CHECKS AND SERVICES ON DRIVER'S STATION

CONDITIONS/STIMULUS

System State: Table A, Column 5A; and an operational radio intercommunications system, Driver and TC CVC helmets, a predetermined frequency set on the radio, a gas mask M25A1, TM 9-2350-255-10-1, and DA Form 2404.

Driver Location: In Driver's Station

Initiating Stimuli: Task 4A is completed.

ACTION

Driver will:

1. Adjust Driver's seat (see Task 2A).
2. Check that position lock holds headrest secure (see Task 2A).
3. Check seat cushions for rips and tears.

NOTE A: After operation, check that upper seat back is down and headrest is in up position.

4. Check Steer-Throttle control as follows:
   a. Move control to full right and left without binding. (Control should return to center under spring tension.)
   b. Twist throttle grips rearward and release. (Grips should return to idle position under spring tension.)
   c. Check adjustment of Steer-Throttle control as follows:
      1). Grasp center housing.
      2). Pull out and hold knob located on left side of center housing.
      3). Pull or push Steer-Throttle control to desired position (control can be adjusted to three positions).
      4). Let go of knob to lock Steer-Throttle control.
      5). Shake Steer-Throttle control to make sure it is locked in place.
5. Check Driver's hatch for ease of operation and and for positive open and closed locking (see Task 2A).
6. Check hatch seal for rips or separation from hatch.
7. Check that periscopes are clear, clean and adjusted for proper viewing (See Task 2A).

8. Check wiper/washer system operations and washer fluid level.

NOTE B: Have some one assist in checking exterior lights.

9. Check light switch (located on Driver's master panel) through complete operation as follows:

   a. Turn LIGHTS Switch to OFF position (no exterior vehicle lights should be lit).
   b. Push LIGHTS Switch toward panel and turn to STOP LIGHT ONLY position [stop lights on rear of tank should light when the service brake pedal (located on floor below STEER-THROTTLE control) is pushed and should go out when pedal is released].
   c. Turn LIGHTS Switch to SERVICE LIGHTS (the headlights and taillights should come on and the stop lights at rear of tank will operate as in b).
   d. Turn LIGHTS Switch to BO position (front and rear black out markers should come on).

10. Check HI BEAM Switch (located on Driver's master panel) as follows:

   a. With LIGHT switch turned to SERVICE LIGHTS flip HI BEAM switch to ON [the HIGH BEAM indicator light (located on Driver's master panel) and high beam elements in headlights should come on].
   b. HI BEAM switch to OFF (the HIGH BEAM indicator light and high beam elements in headlights should go out).

11. Check that panel and domelights work properly (see Task 1A).
12. Operate intercommunications equipment (see Task 4A).
13. Check Hull/Turret Seal and Pump as follows:

   a. Inflate turret seal with hand pump (located to left of Driver's instrument panel) to 16 psi on gage (See Task 3A).
   b. Recheck pressure after five minutes for maximum 2 psi decrease.
   c. Bleed pressure with bleeder valve (See Task 3A).

14. Check Driver's Gas Particle Filter Equipment as follows:

NOTE C: VEHICLE MASTER POWER switch must be set to ON and spring clip removed from precleaner assembly intake opening for gas particle filter to work.

a. Turn GAS PARTICLE FILTER Switch (located on Driver's master panel) to ON.

NOTE D: Green GAS PARTICLE FILTER light should come on.

b. Disconnect break away socket with hose from mount (located on Driver's left side).
c. Connect hose to canister of protective mask, M25A1.
d. If air is too cold to be breathed in comfort, turn on air heater (located below Driver's instrument panel).
e. Turn air heater control knob clockwise until indicator light comes on.
f. Turn knob counter clockwise to decrease temperature; regulate air temperature until comfortable.

NOTE E: Indicator light will go on and off during normal operations.

g. Mask and check operation of filter hose and connector.
h. Check Mask M25A1 and microphone operation (See Task 4A).
i. Unmask and turn air heater OFF.
j. Disconnect hose from mask and connect break-away socket to mount.
k. Stow protective mask.

15. Check Personnel Heater System (located to left rear of Driver) as follows:

a. Check fuel lines for leaks.
b. Check that all mounting clamps, brackets and exhaust tubes are secure.

16. Check Parking Brake System Hydraulic Pressure as follows:

a. With engine off and Vehicle Master Power switch in OFF postion, apply parking brakes (See Task 1A).
b. Watch hydraulic pressure gage (located on Driver's right)-pressure should decrease slowly to 600-800 psi, then drop rapidly to zero pressure.

17. List any uncorrected deficiencies on DA Form 2404 and tell TC.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 17.

Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training: Time - Between end of initiating stimuli and completion of Step 17.

Accuracy - As indicated by:

Deficiencies corrected or listed on operator portion of DA Form 2404.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-39 to 2-40.1, p. 2-42 to p. 2-43, p. 2-63 to p. 2-65, p. 2-82, p. 2-88, p. 2-198.

TM 9-2350-255-10; p. 2-72.

TASK 1B: CHECK DRIVER'S MASTER PANEL SWITCHES

CONDITIONS/STIMULUS

System State: Table B, Column 1B; and, Driver's station prepared for operation.
Driver Location: In Driver's Station.
Initiating Stimuli: TC tells Driver to power up hull systems.

ACTION

Driver will:

1. Check that the following switchs on the master panel (located at Driver's right side) are OFF.
   a. PERSONNEL HEATER
   b. NIGHT PERISCOPE
   c. GAS PARTICLE FILTER
   d. BILGE PUMP
   e. SMOKE GENERATOR
   f. LIGHTS
   g. HI BEAM
   h. TACTICLE IDLE
2. Pull out and lift VEHICLE MASTER POWER switch (located on Driver's master panel) to ON.
3. Release VEHICLE MASTER POWER switch when VEHICLE MASTER POWER Light comes on.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by:
- The following switches being in the OFF position.
  - PERSONNEL HEATER
  - NIGHT PERISCOPE
  - GAS PARTICLE FILTER
  - BILGE PUMP
  - SMOKE GENERATOR
  - LIGHTS
  - HI BEAM
  - TACTICLE IDLE
- VEHICLE MASTER POWER light ON.

REFERENCES

DEP 9-2350-25[illegible] 6-1; p. 2-71.

TASK 2B: TEST AND ADJUST DRIVER COMPARTMENT INDICATOR LIGHTS AND INTERNAL INSTRUMENT LIGHTS

CONDITIONS/STIMULUS

System State: Table B, Column 2B.
Driver Location: In Driver's Station.
Initiating Stimuli: Task 1B is completed.

ACTION

Driver will:

1. Press PANEL LIGHTS TEST pushbutton.
2. Check that all Driver compartment indicator lights (on Alert Panel, Driver's instrument Panel and Driver's Master Panel) and internal instrument lights (2 each in ELECTRICAL SYSTEM voltmeter, FUEL gage and RPM gage) are ON.
3. Release PANEL LIGHT TEST pushbutton.

NOTE A: Do Steps 4 and 6 through 8 if any Driver compartment indicator lights (on Alert Panel, Driver's instrument Panel and Driver's Master Panel) do not light.

4. Replace lamps that do not light as follows:
   a. Unscrew and take off lens.
   b. Pull lamp out of lens and throw lamp away.

NOTE B: Throw away any lens that is cracked.

   c. Put new lamp into lens.
   d. Screw new lamp and lens into housing.

NOTE C: Do Steps 5 and 6 through 8 if any internal instrument lights (2 each in ELECTRICAL SYSTEM voltmeter, FUEL gage and RPM gage) do not light.

5. Replace lamps that do not light as follows:
   a. Turn PANEL LIGHTS brightness control (located on Driver's Master Panel) full counterclockwise.
   b. Unscrew and throw away bad lamp.
   c. Screw new lamp into instrument.
6. Repeat Steps 1 and 2 to verify that all Driver compartment indicator lights and internal instrument lights are on.

7. Release PANEL LIGHTS TEST pushbutton.
8. Turn PANEL LIGHT knob clockwise to make indicator lights and instrument lights brighter, counterclockwise to make them dimmer, as appropriate.

NOTE D: HYDRAULIC PUMP WARNING light is not tested by PANEL LIGHTS TEST pushbutton.

NOTE E: If instrument lamp goes out in VEHICLE SPEED gage, tell TC.

NOTE F: If any one of 13 light emitting diodes (LED) in the MAINTENANCE MONITOR section of the driver's instrument panel do not come on, tell TC.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 8.
Accuracy - As indicated by match between steps given above steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 8.
Accuracy - As indicated by:

- Driver compartment indicator lights and internal instrument light come on when PANEL LIGHTS TEST pushbutton is pressed.
- PANEL LIGHT knob adjusted for panel light illumination.

REFERENCES

DEP 9-2350-255-10-1; p. 2-71 to p. 2-72; p. 3-31 to p.3-32;
DEP 9-2350-255-10-2; p. 2-20.

TASK 3B: CHECK DRIVER'S INSTRUMENT PANEL SWITCHES AND GAGES

CONDITIONS/STIMULUS

System State: Table B, Column 3B.
Driver Location: In Driver's station.
Initiating Stimuli: Task 2B is completed.

ACTION

Driver will:

1. Check that FIRE EXTINGUISHER 2ND SHOT (red cover) is closed.
2. Check that needle on RPM gage is in lowest (left) position.
3. Check that ELECTRICAL SYSTEM gage shows 23 or more volts.

NOTE A: Do step 1 through 6 if ELECTRIC SYSTEM gage shows less than 23 volts. If gage reads 23 or more go to step 7.

4. Reduce electrical load by turning off systems that use electrical power.
5. Check hull networks box (located at rear right of Driver) circuit breaker 29; if it is OFF, move it to ON.
6. Check that ELECTRICAL SYSTEMS gage shows 27.5 to 28.5 volts.

NOTE B: If circuit breaker 29 trips OFF again, leave it OFF and notify TC.

NOTE C: If ELECTRICAL SYSTEMS gage shows more than 29 volts or continues to show less than 23 volts, notify TC.

7. Check that the CABLE DISCONNECT caution light on the MAINTENANCE MONITOR is not lit.

NOTE D: If CABLE DISCONNECT caution light is lit, check that all hull cables are connected.

8. Check that the INTERCOM INOPERATIVE caution light on the MAINTENANCE MONITOR is not lit.

NOTE E: If INTERCOM INOPERATIVE caution light is on, notify TC.

9. Check that the CIRCUIT BREAKER OPEN caution light on the MAINTENANCE MONITOR is not lit.

NOTE F: If CIRCUIT BREAKER OPEN caution light is on, check that all hull network box circuit breakers are in the ON position. If circuit breakers will not stay ON, notify TC.

10. Turn FUEL TANK SELECTOR switch from REAR position to RIGHT FRONT and LEFT FRONT positions; read FUEL gage at each position to check fuel level.
11. Return FUEL TANK SELECTOR switch to REAR position.

MEASUREMENT

During Training:
- Time - Between end of initiating stimuli and completion of Step 11.
- Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training
- Time - Between end of initiating stimuli and completion of Step 11.
- Accuracy - As indicated by:
  - *FIRE EXTINGUISHER 2ND SHOT red cover closed.
  - *RPM gage needle in lowest left position.
  - *FUEL TANK SELECTOR in REAR position.
  - *ELECTRICAL SYSTEM gage showing between 23 and 29 volts.
  - *CABLE DISCONNECTED, INTERCOM INOPERATIVE and CIRCUIT BREAKER OPEN caution lights (on MAINTENANCE MONITOR) not lit.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-72 to 2-72.1; p. 2-69; p. 3-8.2.

TASK 1C: START ENGINE - NORMAL START

CONDITIONS/STIMULUS

System State: Table C, Column 1C; and, Power Up Hull Systems procedures completed.

Driver Location: In Driver's station.

Initiating Stimuli: TC tells Driver to start engine.

ACTION

Driver will:

1. Make sure Driver's seat is in open-hatch position.
2. Press in START button (located on Driver's instrument panel) for about a second.

NOTE A: The STARTED light (located above START button) should come on within 25 to 60 seconds after START button is pressed and will stay on for about 10 seconds.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and 25 to 60 seconds after completion of Step 2.

Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training :

Time - Between end of initiating stimuli and 25 to 60 seconds after completion of Step 2.

Accuracy - As indicated by:

.STARTED light coming on for about 10 seconds.

REFERENCES

DEP 9-2350-255-10-1; p. 2-73.

TASK 1D: MAKE AFTER-START CHECKS ON ENGINE

CONDITIONS/STIMULUS

System State: Table D, Column 1D.
Driver Location: In Driver's station.
Initiating Stimuli: Engine has been started and running for one minute.

ACTION

Driver will:

1. After engine has been running for a minute or longer check that ENGINE RPM gage (located on Driver's instrument panel) is steady and reads 900 to 1,000 RPM. If not, tell TC.
2. Check tacticle idle as follows:
   a. Turn TACTICLE IDEL (located on DRiver's master panel) switch on.
   b. Check that ENGINE RPM gage reads between 1250 and 1350 RPM. If not, tell TC.
   c. Turn TACTICLE IDLE switch off.
   d. Check that ENGINE RPM gage reads between 900 and 1000 RPM. If not, tell TC.
3. Check that the ELECTRICAL SYSTEM voltage gage gage (located on Driver's instrument panel) reads steady between 27.5 and 28.5 volts. If not, tell TC and do troubleshooting.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by:
- 'ENGINE RPM gage steady and reading between 900 to 1000 RPM with TACTICLE IDLE switch off.
- 'ENGINE RPM gage steady and reading between 1250-1350 RPM with TACTICLE IDLE switch on.
- 'ELECTRICAL SYSTEM volt gage steady and reading between 27.5 and 28.5 volts.

Or 'T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-84;

TASK 2D: MAKE AFTER-START CHECKS ON WARNING AND CAUTION LIGHT

CONDITIONS/STIMULUS

System State: Table D, Column 2D.
Driver Location: In Driver's station.
Initiating Stimuli: Task 1D is completed.

ACTION

Driver will:

1. Check that all red warning and yellow caution lights are out.

NOTE A: SEE MODULE F if any warning or caution lights are lit.

MEASUREMENT

During Training:

Time - Between the end of initiating stimuli and completion of Step 1.

Accuracy - As indicated by match between Steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimuli and completion of Step 1.

Accuracy - As indicated by:

- All red warning and yellow caution lights out.

Or

- TC. notified.

REFERENCES

TM 9-2350-255-10-1; p. 2-85.

TASK 3D: MAKE AFTER-START CHECKS ON HYDRAULICS

CONDITIONS/STIMULUS

System State: Table D, Column 3D.
Driver Location: In Driver's station.
Initiating Stimuli: Task 2D is completed.

ACTION

Driver will:

1. Have gunner check that HYDRAULIC SYSTEM PRESSURE gage (located to left of Gunner's primary sight) is steady and reading between 1550 and 1650 psi. If not, tell TC.
2. Check that HYDRAULIC PUMP light (located to right of Driver's instrument panel) is not lit. If light is lit, do the following:
   a. Pullout and set SHUT OFF switch (located on Driver's master panel) to SHUT OFF position.
   b. Tell TC.
3. Check that Parking Brake system hydraulic pressure gage (located to right forward of Driver's seat) shows between 1200 and 1600 psi. If not, do the following:
   a. Pullout and set SHUT OFF switch to SHUT OFF position.
   b. Set and hold MASTER VEHICLE POWER (located on Driver's master panel) to OFF, then let it go.
   c. Tell TC.

MEASUREMENT

During Training:
Time - Between the end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between the end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by:
- The HYDRAULIC SYSTEM PRESSURE gage and reading between 1550 and 1650 and 1650 psi.
- The HYDRAULIC PUMP light out.
- The Parking Brake system hydraulic pressure gage showing 1200-1600 psi.

Or
- TC notified.

REFERENCES

TM 9-2350-255-10; p. 2-86.

TASK 4D: MAKE AFTER-START CHECK ON BRAKES

CONDITIONS/STIMULUS

System State: Table D, Column 4D.
Driver Location: In Driver's station.
Initiating Stimuli: Task 3D is completed.

ACTION

Driver will:

1. Press and hold the service brake pedal (located on floor below Steer-Throttle control) all the way down, checking that pedal feels solid and does not touch toeboard. If it does not feel solid or touches toeboard, tell TC.
2. Release brake pedal.
3. Inform ground guide and turret crew that parking brake test is to be pwerformed.
4. Hold down service brake pedal.
5. Pull out PARKING BRAKE RELEASE handle (located at Driver's right hand), then let it go.
6. Check that PARKING/SERVICE BRAKE ON light (located on Driver's master panel) is OFF.

NOTE A: PARKING/SERVICE BRAKE ON light will/ *come back on* when service brakes have been engaged for more than two minutes with engine running. Check must be done within two minutes.

NOTE B: If PARKING/SERVICE BRAKE ON light stays on in the two minute period after the PARKING BRAKE RELEASE handle has been pulled, do Steps 7 through 10. Otherwise, go to Step 11.

7. Press parking brake pedal (located near Driver's right foot) as far as it will go, then let it go.
8. Let go of service brake pedal.
9. Repeat Steps 1 through 6.
10. If PARKING/SERVICE BRAKE ON light is still lit pull out and Set SHUT OFF switch (located on Driver's master panel) to SHUT OFF and tell TC.
11. Move transmission shift control (located on Steer-Throttle control) to D.
12. Slowly twist throttle grips (located on Steer-Throttle control) rearward until ENGINE RPM gage (located on Driver's instrument panel) reads 1450-to 1550 RPM.

13. Note that tank does not creep forward.
14. Twist throttle grips as far forward as possible.
15. Press and hold parking brake pedal (located near Driver's right foot).
16. Set transmission shift control to N.
17. Press and hold service brake pedal.
18. Let go of parking brake and service brake pedals.
19. Pull out and set SHUT OFF switch to SHUT OFF.
20. Tell TC.

NOTE C: If tank creeps or turns while throttle grips are twisted, do steps 14 through 20. If tank does not move go to Step 21.

21. Twist throttle grips as far forward as possible.
22. Inform crew and ground guide that brake checks are finished and that tank is ready to move.

NOTE D: If tank is not to be moved immediately, proceed with steps 23 and 24.

23. Set Transmission shift control to N.
24. Press in parking brake pedal (located at Driver's right foot) to set parking brake.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 20 (or 22; or 24).

Accuracy - As indicated by match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimuli and completion of Step 20 (or 22; or 24).

Accuracy - As indicated by:

- The service brake pedal feeling solid and not touching toeboard when pressed down.
- The tank not creeping when service brake pedal is held down with ENGINE RPM gage reading between 1450 and 1550 RPM.

Or

- TC told that service brake is not working.

REFERENCES

TM 9-2350-255-10; pp. 2-86 to 2-87.

TASK 1F: RESPOND TO MASTER CAUTION LIGHT

CONDITIONS/STIMULUS

System State: Table F, Column 1F.
Driver Location: In Driver's station.
Initiating Stimuli: MASTER CAUTION light (located above Driver's head) goes on.

ACTION

Driver will:

NOTE A: When MASTER CAUTION light comes on, check which of the MAINTENANCE MONITOR lights (located on Driver's instrument panel) is lit. Each light indicates a specific problem. See steps 1 to 14 for the correct response.

1. When ENGINE OIL LOW light is lit, respond as follows:
   a. Turn throttles to idle.
   b. Press service brake pedal to stop tank.
   c. Engage parking brake.
   d. Push transmission control to N.
   e. Check engine oil level.
   f. If engine oil level is low, add oil, continue operation and reset MASTER CAUTION light by pushing RESET button (located on Driver alert panel).
   g. If engine oil level is OK, reset MASTER CAUTION light by pushing RESET button, continued operation and tell TC.
2. When CABLE DISCONNECTED caution light is lit, respond as follows:
   a. Turn throttles to idle.
   b. Press service brake pedal and stop tank.
   c. Engage parking brake.
   d. Move transmission on shift control to N.
   e. Check that all hull cable connections are tight.
   f. Reset MASTER CAUTION light by pushing RESET button.
   g. Continue operation if CABLE DISCONNECTED and MASTER CAUTION lights go off.
   h. Tell TC if CABLE DISCONNECTED and MASTER CAUTION lights stay on.

3. When CIRCUIT BREAKER OPEN caution light is lit, respond as follows:

   a. Turn throttles to idle.

   b. Press service brake pedal and stop tank.

   c. Engage parking brake.

   d. Move transmission shift controls to N.

   e. If any circuit breakers in the hull networks box (located to right-rear side of Driver) is at the OFF position, set to ON and go to g.

   f. If all circuit breakers are in the ON position, check all circuit breakers in the hull distribution box (located at Driver's right shoulder) as follows:

      1) If any circuit breakers are at OFF position, set to ON and go to g.

      2) Tell TC if all circuit breakers are at ON position.

   g. Reset MASTER CAUTION light by pushing RESET button.

      1) Continue operation if CIRCUIT BREAKER CREW light goes off.

      2) Tell TC if CIRCUIT BREAKER OPEN light stays lit.

4. When HYDRAULIC SYSTEM MALFUNCTION light is lit after started light (located on Driver's instrument panel) is lit, respond as follows:

   a. Turn throttles to idle.

   b. Press service brake pedal and stop tank.

   c. Engage parking brake.

   d. Push transmission control to N.

   e. Pull out and set SHUT OFF switch to SHUT OFF.

   f. Check hydraulic reservoir oil level.

   g. Tell TC if oil needs to be added or if fluid level is OK.

5. When TRANSMISSION OIL LOW caution light is lit, respond as follows:

   NOTE B: The TRANSMISSION OIL LOW caution light may stay on briefly after start until oil warms up.

   a. Turn throttles to idle.

   b. Press service brake pedal and stop tank.

   c. Engage parking brake.

   d. Move transmission shift control to N.

   e. Check transmission oil level.

f. If transmission oil level is low, add oil, continue operation and reset MASTER CAUTION light by pushing RESET button.

g. If transmission oil level is OK, reset MASTER CAUTION light by pushing RESET button, tell TC and continue operation.

6. When ENGINE OIL FILTER CLOGGED light is lit, tell TC.

7. When TRANSMISSION OIL FILTER CLOGGED light is lit, tell TC.

8. When FUEL-WATER SEPARATOR FILTER CLOGGED light is lit, tell TC.

9. When AIR CLEANER FILTER CLOGGED light flickers on and off, disregard it and reset MASTER CAUTION light by pushing RESET button.

10. When AIR CLEANER FILTER CLOGGED light is lit (steadily), tell TC and service air cleaner as soon as possible. (See Task 2P.)

11. When REAR FUEL PUMP-R light is lit, respond as follows:

a. Turn throttles to idle.

b. Press service brake pedal and stop tank.

c. Engage parking brake.

d. Move transmission shift control to N.

e. Check hull networks circuit breaker CB13.

1) If circuit breaker is in OFF position, set to ON, tell TC, reset MASTER CAUTION light by pushing RESET button, and continue operation.

2) If circuit breaker is in ON position, go to f.

f. Check REAR FUEL PUMP-L light:

1) If both REAR FUEL PUMP-R and REAR FUEL PUMP-L lights are lit, shut down engine (see Module L) and tell TC.

2) If REAR FUEL PUMP-L is not lit, tell TC, reset MASTER CAUTION light by pushing RESET button and continue operation.

12. When REAR FUEL PUMP-L light is lit, respond as follows:

a. Turn throttles to idle.

b. Press service brake pedal and stop tank.

c. Engage parking brake.

d. Move transmission shift control to N.

e. Check hull networks circuit breaker CB12:

1) If circuit breaker is in OFF position, set to ON, tell TC, reset MASTER CAUTION light by pushing RESET button, and continue operation.

2) If circuit breaker is in ON position, go to f.

f. Check REAR FUEL PUMP-R light:

1) If both REAR FUEL PUMP-L and REAR FUEL PUMP-R lights are lit, shut down engine (see Module L) and tell TC.

2) If REAR FUEL PUMP-R light is not lit, tell TC, reset MASTER CAUTION light by pushing RESET button, and continue operation.

13. When FUEL CONTROL FAULTY light is lit, respond as follows:

a. Turn throttles to idle.

b. Press service brake pedal and stop tank.

c. Engage parking brake.

d. Move transmission shift control to N.

e. Check engage RPM gage:

1) If low (below 900 rpm), do f through i.

2) If normal (between 900-1000 rpm), go to j.

f. Move transmission shift control to D.

g. Push reset button on Driver's alert panel and hold for 10 seconds.

h. Check FUEL CONTROL FAULTY light:

1) If OFF, reset MASTER CAUTION light by pushing RESET button.

2) If ON, shut down engine (see Task 1f) and go to i.

i. Restart engine (see Task C):

1) If engine starts and FUEL CONTROL FAULTY light is not lit, reset MASTER WARNING light by pushing RESET button and continue operation.

2) If engine starts and FUEL CONTROL FAULTY light lights, tell TC, reset MASTER CAUTION light by pushing RESET button and operate at reduced power.

3) If engine does not start, tell TC.

j. Continue operation.

k. Monitor engine performance:

1) If engine does not lose power, tell TC and continue operation.

2) If engine loses power, repeat f through i once.

3) If engine continues to lose power, tell TC.

14. When 1ST SHOT DISCHARGE light is lit, respond as follows:

a. Alert crew to fire.

b. Have turret and gun moved so Driver can exit.

c. Look at instrument panel. If ENGINE FIRE light is lit and the MASTER WARNING is flashing, see Task 4F for correct response.

MEASUREMENT

During Training:
Time - Between the end of the initiating stimuli and completion of the necessary step.
Accuracy - As indicated by the match between the steps given above and the steps performed by Driver.

End of Training:
Time - Between the end of the initiating stimuli and the completion of the necessary step.
Accuracy - As measured by:

. The MASTER CAUTION light not lit.
. All of the MAINTENANCE MONITOR lights not lit.
or . TC notified.

REFERENCES

TM 9-2350-255-10; pp. 2-73, 2-79; p. 2-80, p. 3-12, p. 3-13, pp. 3-15 to 3-18; p. 3-20, p. 3-21.

TASK 2F: RESPOND TO LOW BATTERY CHARGE YELLOW CAUTION LIGHT

CONDITIONS/STIMULUS

System State: Table F, Column 2F.
Driver Location: In Driver's station.
Initiating Stimuli: LOW BATTERY CHARGE light goes on.

ACTION

Driver will:

NOTE A. When LOW BAT CHARGE light (located on Driver's instrument panel) is lit with engine running, do steps 1 through H. With engine off, do steps 12 through 15.

1. Check voltage gage (located on Driver's instrument panel):
   a. If gage reads 23 volts or less, go to Step 2.
   b. If gage reads above 23 volts, tell TC.
2. Turn throttles to idle.
3. Press service brake pedal and stop tank.
4. Engage parking brake.
5. Move transmission shift to N.
6. Check hull networks box circuit breakers CB15 and CB29 and hull distribution box circuit breaker CB6:
   a. If any circuit breakers are at OFF position, set to ON.
      1) If light goes out, continue operation.
      2) If light does not go out, tell TC.
   b. If all of the circuit breakers are at the ON position, go to Step 7.
7. Shut down engine (see Module L.
8. Check battery condition indicators:
   a. If any indicators show clear or black, service batteries (see Task 1P).
   b. If all indicators show green, go to Step 9.
9. Inspect battery buss bars and terminals:
   a. If any buss bars or terminals are corroded or broken, tell TC.
   b. Reconnect to battery and tighten any loose buss bars or terminals.
   c. If all buss bars and terminals are OK, go to Step 10.

10. Start engine (see Module C).

11. Check that voltage gage reads between 27.5 and 28.5 volts.

    a. If gage reads between 27.5 and 28.5 volts, continue operation.

    b. If gage reads less than 27.5 volts, tell TC.

12. Start engine (see Module C).

13. If engine will not start, slave start tank (see Module O) and go to Step A.

14. Run engine at TACTICAL IDLE (see Task 1D).

15. Check LOW BATTERY CHARGE light.

    a. If light goes off, run engine 15 minutes more.

    b. If light stays lit, tell TC.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 11 (or 15).
Accuracy - As indicated by the match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 11 (or 15).
Accuracy - As indicated by:
. LOW BAT CHARGE light is not lit.
or . TC notified.

REFERENCES

TM 9-2350-255-10; pp. 3-18 and 3-19.

TASK 3F: RESPOND TO LOW FUEL LEVEL YELLOW CAUTION LIGHT

CONDITIONS/STIMULUS

System State: Table F, Column 3F.
Driver Location: In Driver's station.
Initiating Stimuli: LOW FUEL LEVEL light (located on Driver's instrument panel) goes on.

ACTION

Driver will:

1. Make sure that tank is on level ground to assure an accurate low fuel indication.

   NOTE A. LOW FUEL LEVEL light should come on when the fuel level in the rear tank is down to 1/4, as seen on the fuel gage. Tell the TC if light comes on and the fuel gage shows more than 1/4 or if light does not come on and the gage shows less than 1/4.

2. Refuel if possible (see Task ___. If not possible, do Steps 3 through 5.

3. Push in and set TANK SELECTOR switch (located on Driver's instrument panl) to RIGHT FRONT to transfer fuel to rear tank.

4. Push in and set TANK SELECTOR switch to LEFT FRONT from RIGHT FRONT position if LOW FUEL LEVEL light goes on again.

   NOTE B. TANK SELECTOR switch should be set to REAR position during engine start.

5. Push in and set TANK SELECTOR switch to REAR when fuel transfer is completed.

   NOTE C. If front fuel pump does not work, do Step 6.

6. Check hull networks box (located to right rear of Driver) circuit breaker CB 14 and CB 15.

   a. If all circuit breakers are at ON position, tell TC.

   b. If any circuit breaker is at OFF position, set to ON.

      1) If pump now works, continue operation.

      2) If pump does not work, tell TC.

MEASUREMENT

During Training:
- Time - Between end of initiating stimuli and completion of step 5 (or 6).
- Accuracy - As indicated by the match between steps given above and steps performed by the Driver.

End of Training:
- Time - Between end of initiating stimuli and completion of Step 5 (or 6).
- Accuracy - As indicated by:
  - . LOW FUEL LEVEL light no longer lit.
  - or . TC notified.

REFERENCES

TM 9-2350-255-10-1; p.2-69; p.2-81; p.3-39

TASK 4F: RESPOND TO MASTER WARNING LIGHT

CONDITIONS/STIMULUS

System State: Table F, Column 4F.
Driver Location: In Driver's station.
Initiating Stimuli: MASTER WARNING light (located above Driver's head) goes on.

ACTION

Driver will:

1. If MASTER WARNING light is flashing and ENGINE FIRE light is lit, respond as follows:
   a. Tell TC.
   b. Turn throttles to idle.
   c. Press service brake pedal and stop tank.
   d. Engage parking brake.
   e. Set transmission control to N.
   f. When told by TC, open cover over 2ND SHOT switch (located on Driver's instrument panel) and move switch to rear.
   g. If MASTER WARNING continues to flash, ENGINE FIRE light remains on and fire continues to burn, respond as follows:
      1) Hold VEHICLE MASTER POWER switch (located on Driver's master panel) to OFF, then let go.
      2) Exit tank when told by TC.
   h. If lights go off, tell TC.

   NOTE A. When MASTER WARNING light is lit (steady), che which of the other warning lights (located on Driver's instrument panel) is also lit. Each light indicates a specific problem. See steps 2 to 7 for correct response.

2. If ENGINE OVERSPEED light is lit, respond as follows:
   a. Slow down tank.
   b. Reset MASTER WARNING light by pushing RESET button (located on Driver's alert panel).
   c. If light goes out, continue mission.

d. If light stays lit, respond as follows:

1) Turn throttles to idle.

2) Press service brake pedal and stop tank.

3) Engage parking brake.

4) Look at ENGINE RPM gage (located on Driver's instrument panel) to see that engine slows to 1200 rpm or less. It it does, reset MASTER WARNING light by pushing RESET button and continue mission. If it does not, go to e.

e. If ENGINE RPM gage still reads more than 1200 rpm, respond as follows:

1) Set transmission control to N.

2) Check that TACTICAL IDLE switch (located Driver's master panel) is in OFF position.

3) Look at gage to see that engine shows to 950 rpm.

a) If it does, reset MASTER WARNING light by pshing RESET button and continue normal operation.

b) If it does not, shut down engine (see MODULE L) and tell TC.

3. If GAS OVERTEMP light is lit, respond as follows:

a. Slow down engine.

b. Reset MASTER WARNING light by pushing RESET button.

c. If light goes out, continue mission.

d. If light stays lit, respond as follows:

1) Turn throttles to idle.

2) Press service brake and stop tank.

3) Engage parking brake.

4) Check that TACTICAL IDLE switch is in OFF position.

5) If light goes out when engine speed is between 900 and 1000 rpm on the ENGINE RPM gage reset MASTER WARNING light by pushing RESET button and continue mission. If it does not, go to e.

e. If light stays on, or comes back on with engine speed between 900 and 1000 rpm, respond as follows:

1) Shut down engine (see Module L).

2) Tell TC.

4. If ENGINE OIL PRESS LOW light is lit, engine should shut down automatically. If it does not, respond as follows:

   a. Turn throttles to idle.

   b. Press service brake pedal and stop tank.

   c. Engage parking brake.

   d. Shut down engine (see Module L).

   e. Check engine oil level:

      1) If engine oil level is OK, tell TC.

      2) If engine oil level is low, add oil and go to e.

   f. Reset MASTER WARNING light by pushing RESET button.

   g. Start engine (see Module C).

   h. Set TACTICAL IDLE switch to ON position:

      1) If engine shuts down and ENGINE OIL PRESS LOW light goes on, tell TC.

      2) If ENGINE OIL PRESS LOW light does not light, continue normal operation.

5. If ENGINE OIL TEMP HIGH light is lit, respond as follows:

   a. Reduce power for one minute:

      1) If light goes off, reset MASTER WARNING light by pushing RESET button and continue normal operation.

      2) If light stays on, go to b.

   b. Turn throttles to idle.

   c. Press service brake pedal and stop tank.

   d. Engage parking brake.

   e. Set transmission control to N.

   f. Let engine idle for one minute:

      1) If light goes off, reset MASTER WARNING light by pushing RESET button and continue normal operation.

      2) If light stays on or comes on again, shut down engine (see Module L) and go to g.

   g. Check rear grill doors:

      1) If louvers on rear grille doors are plugged, clean out louvers.

      2) If louvers are clean, go to h

   h. Check engine oil level:

      1) If engine oil level is OK, tell TC.

      2) If engine oil level is slow, add oil and go to i.

i. Reset MASTER WARNING light by pushing RESET button.

j. Start engine (see Module C).

1) If light comes on, shut down engine (see Module L) and tell TC.

2) If light stays off, continue normal operation.

6. If TRANSMISSION OIL TEMP HIGH light is lit, respond as follows:

NOTE B: If both TRANSMISSION OIL TEMP HIGH and TRANSMISSION OIL PRESS LOW lights are lit, shut down engine (see Module L) and tell TC.

a. Reduce power for one minute:

1) If light goes off, reset MASTER WARNING light by pushing RESET Button and continue normal operation.

2) If light stays lit, go to b.

b. Check BILGE PUMP switch:

1) If switch is set to OFF, go to C.

2) If switch is set to ON, move switch to OFF position.

3) Operate tank at reduced power for one minute:

a) If light stays lit, go to c.

b) If light goes off, reset MASTER WARNING light by pushing RESET button and continue normal operation.

c. Turn throttles to idle.

d. Press service brake pedal and stop tank.

e. Engage parking brake.

f. Set transmission control to N.

g. Set TACTICAL IDLE switch to ON for four minutes.

h. With engine at TACTICAL idle, check right cooling fan operation by having someone check for air flow from the right rear grilles.

1) If fan is working, go to i.

2) If fan is not working, go to j.

i. Check TRANSMISSION OIL TEMP HIGH light again:

1) If light stays lit, go to j.

2) If light goes off, run engine at TACTICAL IDLE for two more minutes.

3) Reset MASTER WARNING light by pushing RESET butt

4) Set TACTICAL IDLE switch to OFF.

5) Continue normal operation.

j. Set hull networks box circuit breaker CB18 to OFF.

1) If TRANSMISSION OIL TEMP light goes off:

a) Set TACTICAL IDLE switch to OFF.

b) Reset MASTER WARNING light by pushing RESET b

c) Continue normal operation.

d) Tell TC that cooling fan is not working.

2) If light stays on, set circuit breaker CB18 to ON and go to k.

k. Check transmission oil level:

1) If oil level is OK, tell TC.

2) If oil level is low, add oil, reset MASTER WARNING light by pushing RESET button and continue normal operation.

7. If TRANSMISSION OIL PRESS LOW light is lit, respond as follows:

NOTE C: If both TRANSMISSION OIL TEMP HIGH and TRANSMISSION OIL PRESS LOW lights are lit, shut down engine (see Module L) and tell TC.

a. Turn throttles to idle.

b. Press service brake pedal and stop tank.

c. Engage parking brake.

d. Set transmission control to N.

e. Check TRANSMISSION OIL CLOGGED FILTER light (located on Driver's instrument panel):

1) If light is lit, shut down engine (see Module L) and tell TC.

2) If light is not lit, go to f.

f. Check transmission oil level.

1) If oil level is OK, tell TC.

2) If oil level is low, add oil and go to g.

g. Check TRANSMISSION OIL PRESSURE LOW light.

1) If light stays lit, or lights again, shut down engine (see Module L) and tell TC.

2) If light goes out, reset MASTER WARNING light by pushing RESET button and continue normal operation.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of the necessary step.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of the necessary step.
Accuracy - As indicated by:

. MASTER WARNING light not lit.
. All warning lights not lit.
or . TC notified.

REFERENCES

TM 9-2350-255-10; pp. 2-78 and 2-79; pp. 2-73 and 2-74; pp. 3-11 to 3-15.

TASK 1G: OPERATE ENGINE COMPARTMENT FIRE EXTINGUISHER-- AUTOMATIC MODE

CONDITIONS/STIMULUS

System State: Table G, Column 1G
Driver Location: In Driver's station
Initiating Stimuli: Fire in engine compartment

ACTION

Driver will:

1. When 1st SHOT DISCHARGE light is lit, respond as follows:
   a. Alert crew to fire.
   b. Have turret and gun moved so Driver can exit.
   c. Look at instrument panel. If ENGINE FIRE light is lit and the MASTER WARNING light is flashing, see Task 4F, Step 1, for correct response.

NOTE A: If fire continues to burn, use portable fire extinguishers to put it out. (See Task 5G).

MEASUREMENT

During Training:
Time - Between detection of initiating stimuli and completion of Step 1.
Accuracy - As indicated by match between steps given above and steps performed by driver.

End of Training:
Time - Between detection of initiating stimuli and completion of Step 1.
Accuracy - As indicated by:
.Fire in engine compartment extinguished.
or .Use of portable fire extinguishers.

REFERENCES

TM 9-2350-255-10; pp. 2-73 and 2-74; p. 2-77.

TASK 2G: OPERATE ENGINE COMPARTMENT FIRE EXTINGUISHER-- MANUAL MODE

CONDITIONS/STIMULUS

System State: Table G, Column 2G.
Driver Location: In Driver's Station.
Initiating Stimuli: Fire in engine compartment.

ACTION

Driver will:

1. Tell crew about fire.
2. Pull ENGINE FIRE handle (located to left of driver.)
3. If possible, turn tank to face into wind. (See Task 2E.)
4. Turn throttles to idle.
5. Press service brake pedal to stop tank.
6. Engage parking brake.
7. Set transmission control to N.
8. If fire still burns:
   a. Check that VEHICLE MASTER POWER switch is set in the ON position.
   b. Open 2ND SHOT cover (located on Driver's instrument panel) and move switch to rear.
   c. Exit tank when told by T.C.

   NOTE A: If 2ND SHOT does not operate or crew is outside tank, do Step 9.

9. Pull ENGINE FIRE handle on outside of tank (located on left side of tank.)

   NOTE B: If fire continues to burn, use portable fire extinguishers to put it out. (See Task 5G.)

MEASUREMENT

During Training

Time - Between detection of initiating stimuli and completion of Step 7 (or 8 or 9.)
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training

Time - Between dectection of initiating stimuli and completion of Step 7 (or 8 or 9.)
Accuracy - As indicated by:

.Fire in engine compartment extinguished.
or .Use of portable fire extinguishers.

REFERENCES

TM 9-2350-255-10; pp. 2-74 and 2-77.

TASK 3G: OPERATE CREW COMPARTMENT FIRE EXTINGUISHER-- AUTOMATIC MODE

CONDITIONS/STIMULUS

System State: Table G, Column 3G.
Driver Location: In Driver's Station.
Initiating Stimuli: Activation of automatic crew compartment fire extinguisher.

ACTION

Driver will:

NOTE A: Activation of automatic crew compartment fire extinguisher is indicated by loud noise and a cloudy gas in crew compartment.

1. Turn throttles to idle.
2. Press service brake pedal to stop tank.
3. Engage parking brake.
4. Set transmission control to N.
5. Pull out and set ENGINE SHUT OFF switch (located on Driver's master panel) to SHUT OFF position.
6. Hold VEHICLE MASTER POWER switch (located on Driver's master panel) to OFF position, then let go.
7. Exit tank when told by T.C.

NOTE B: If fire continues to burn, use portable fire extinguisher to put it out (See Task 5G).

8. When fire is out, open all hatches and let tank air out for five minutes before continuing operation.

MEASUREMENTS

During Training

Time - Between detection of initiating stimuli and completion of Step 8.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training

Time - Between detection of initiating stimuli and completion of Step 8.
Accuracy - As indicated by:

.Fire in crew compartment extinguished.
.Tank aired out.
or .Use of portable fire extinguishers

REFERENCES

TM 9-2350-255-10; pp. 2-75 and 2-77

TASK 4G: OPERATE CREW COMPARTMENT FIRE EXTINGUISHER-- MANUAL MODE

CONDITIONS/STIMULUS

System State: Table G, Column 4G
Driver Location: In Driver's Station
Initiating Stimuli: Fire in crew compartment and automatic fire extinguisher does not work.

ACTION

Driver will:

1. Pull CREW FIRE handle (located to left of driver).
2. Turn throttles to idle.
3. Press service brake pedal to stop tank.
4. Engage parking brake.
5. Set transmission control to N.
6. Pull out and set ENGINE SHUT OFF switch (located on Driver's master panel) to SHUT OFF position.
7. Hold VEHICLE MASTER POWER switch (located on Driver's master panel) to OFF position, then let go.
8. Exit tank when told by T. C.

   NOTE A: If fire continues to burn, use portable fire extinguishers to put it out (See Task 5G).

9. When fire is out, open all hatches and let tank air out for five minutes before continuing operation.

MEASUREMENT

During Training

Time - Between detection of initiating stimuli and completion of Step 9.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training

Time - Between detection of initiating stimuli and completion of Step 9.
Accuracy - As indicated by:

.Fire in crew compartment extinguished.
.Tank aired out.
or .Use of portable fire extinguishers.

REFERENCES

TM 9-2350-255-10; pp. 2-76 and 2-77.

TASK 1H: OPERATE GAS PARTICULATE FILTER SYSTEM

CONDITIONS/STIMULUS

System State: Table H, Column 1H.
Driver Location: In Driver's Station.
Initiating Stimuli: Indication of NBC attack.

ACTION

Driver will:

NOTE A: The precleaner assembly opening springclip must be removed by turret crew member for gas particulate system to work.

1. Stop breathing.
2. Put on protective gas mask.
3. Clean and seal mask.
4. Start breathing.
5. Connect mask intercom head to connector on CVC helmet, (located on left side).
6. Alert other personnel to NBC attack.
7. Set GAS PARTIC switch (located on Driver's master panel) to ON. If GAS PARTIC light (located on Driver's master panel) or gas particulate filter blower motor does not go on, do steps 8 through 11. If they do go on, go to step 12.
8. Check hull networks box circuit breaker (located at driver's right shoulder) CB 22:
   a. If circuit breaker is in ON position, go to step 9.
   b. If circuit breaker is in OFF position, set to ON.
      1) If light and blower come on, go to step 12.
      2) If light or blower remains off, go to step 9.
9. Listen for precleaner and filter motor operation.
   a. If operating, go to step 11.
   b. If not operating, go to step 10.
10. Check if precleaner and filter unit motor, cable and ground (located near bottom left hand side of Driver's seat) are connected.
   a. If connected, go to step 11.
   b. If loose, connect.
      1) If light and blower come on, go to Step 12.
      2) If light and blower remain off, go to Step 1.
11. Check condition and connection of hose assembly:
   a. If hose is pinched, remove obstructions.
      1) If light and blower come on, go to Step 12.
      2) If light and blower remain off, tell TC.
   b. If hose is disconnected, reconnect hose.
      1) If light and blower on, go to Step 12.
      2) If light and blower remain off, Tell TC.
   c. If spring clip is in closed position, set to open position.
      1) If light and blower come on, go to Step 12.
      2) If light and blower remain off, tell TC.

d. If hose and spring clip are okay, tell T. C.

12. Pull hose socket away from mount (located to left side of Driver's instrument panel).

NOTE B: Under arctic winter conditions put on mask (steps 1 through 11), but do not connect hose socket to mask cannister (located on end of mask hose) (step 13) until air heater has been on for at least 15 minutes (step 14).

13. Connect hose socket to mask cannister.
14. If air is too cold to breathe in comfort, turn air heater knob (located below Driver's instrument panel) clockwise until heater light (located next to knob) is lit.
    a. Turn knob clockwise for warmer air.
    b. Turn knob counter clockwise for cooler air.
    c. If Driver's gas particulate heater does not warm air, do step 15. If heater works properly, go to step 16.
15. Check hull networks box circuit breaker CB 29.
    a. If breaker is at ON position, tell T. C.
    b. If circuit breaker is at OFF position, set to ON.
        1) If heater begins to work properly, go to step 16.
        2) If heater still does not work, tell T.C.
16. When gas particulate filter system is no longer needed, remove mask.
17. Disconnect mask intercom lead from connector on CVC helmet.
18. Stow mask.
19. Disconnect hose socket from mask cannister.
20. Connect hose socket to mount.
21. Turn air heater knob counter clockwise all the way.
22. Set GAS PARTIC switch to OFF.
23. Have turret crew member put spring clip over air precleaner assembly opening.

MEASUREMENT

During Training:

Time - Between detection of initiating stimuli and completion of step 23.

Accuracy - As indicated by the match between steps given above and steps performed by Driver.

End of Training:

Time - Between detection of initiating stimuli and completion of step 23.

Accuracy - As indicated by:

.Driver unaffected by NBC attack
.GAS PARTIC light and blower working with GAS PARTIC switch in ON position.

.Gas particulate heater warming air properly with light lit when air heater knob is turned clockwise.
.Mask stowed.
.Hose socket connected to mount.
.Air heater knob turned counter clockwise all the way.
.GAS PARTIC switch at OFF position.
.Spring clip over air precleaner assembly opening.

REFERENCES

TM 9-2350-255-10; pp. 2-88 and 2-89; p. 3-67; pp. 3-68 and 3-69.

TASK 1J: OPERATE PERSONNEL HEATER - FAN ONLY

CONDITIONS/STIMULUS

System State: Table J, Column 1J
Driver Location: In Driver's Station.
Initiating Stimuli: Request for fan by crew member.

ACTION

Driver will:

1. Set PERSONNEL HEATER switch (located on Driver's master panel) to RUN/FAN. If fan comes on, go to Step 3; if not, do Step 2.
2. Check hull networks box (located to right rear of Driver), circuit breaker CB 17.
   a. If circuit breaker is at ON position, tell T. C.
   b. If circuit breaker is at OFF position, set to ON.
      1) If fan comes on, go to Step 3.
      2) If fan remains OFF, tell T. C.
3. When fan is no longer needed, set PERSONNEL HEATER switch to OFF.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 3.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 3.
Accuracy - As indicated by:
.Fan ventilating the tank properly.
or .T. C. notified

REFERENCES

TM 9-2350-255-10; p. 2-91; pp. 3-70 to 3-71.

TASK 2J: OPERATE PERSONNEL HEATER - FAN AND HEATER

CONDITIONS/STIMULUS

System State: Table J, Column 2J.
Driver Location: In Driver's Station.
Initiating Stimuli: Request for heat by crew member.

ACTION

Driver will:

1. Set PERSONNEL HEATER HIGH/LOW switch (located on Driver's master panel) to LOW.
2. Set PERSONNEL HEATER switch (located on Driver's master panel) up to START position and hold.
3. When PERSONNEL HEATER light (located on Driver's master panel) comes on, set PERSONNEL HEATER switch to RUN/FAN. If light and fan come on, go to step 7. If not, do steps 4 through 6.
4. Check left front fuel tank fuel level.
   a. If left front fuel tank has fuel, go to step 5.
   b. If tank is empty, tell TC.
5. Check hull networks box circuit breaker CB 16 and CB 17.
   a. If circuit breakers are in ON position, go to step 6.
   b. If a circuit breaker is at OFF position, set to ON.
      1) If fan and light come on, go to step 7.
      2) If fan or light does not work, go to step 6.
6. Check hull distribution box (located at Driver's right shoulder) circuit breaker CB 7.
   a. If circuit breaker is at ON position, tell T.C.
   b. If circuit breaker is at OFF position, set to ON.
      1) If fan and light come on, go to step 7.
      2) If fan and light remain off, tell T. C.
7. Set HIGH/LOW switch to HIGH if more heat is desired.

   NOTE A: If PERSONNEL HEATER blows cold air, do steps 4 through 6.

8. Set heater control lever (located to left of Driver's instrument panel) as needed:
   a. Set lever to TURRET to direct most heater air flow to turret.
   b. Set lever to MIX to direct heater airflow to both turret and driver's station.
   c. Set lever to DRIVER to direct most heater airflow to driver's station.

9. Adjust flow control handle (located under Driver's instrument panel) to direct heater airflow on upper body, feet, or both as needed.
10. Adjust vent (located under Driver's instrument panel) to direct heater airflow on upper body as needed.
11. When heater is no longer needed, set PERSONNEL HEATER switch to OFF.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of step 11.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of step 11.
Accuracy - As indicated by:
.PERSONNEL HEATER and FAN heating the tank properly.
or .T. C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-91 through p. 3-71.

TASK 1K: OPERATE OUTSIDE LIGHTS

CONDITIONS/STIMULUS

System State: Table K, Column 1K
Driver Location: In Driver's Station
Initiating Stimuli: Beginning of night operation

ACTION

Driver will:

NOTE A: Have someone check that outside lights work before driving at night.

1. To operate with only stoplights on rear of tank, push in and set LIGHTS switch (located on Driver's master panel) to STOP LIGHTS ONLY. If stoplights work, continue operation; if not, do a through c.
   a. Check hull networks box (located to Driver's rear right side) circuit breaker CB 22.
      1) If circuit breaker is at ON position, go to b.
      2) If circuit breaker is at OFF position, set to ON.
         a) If stoplights work, continue operation.
         b) If stoplights do not work, go to b.
   b. Check that stoplight lamps are not burned out.
      1) If all lamps are okay, go to c.
      2) If any lamp is burned out, replace lamp. (See Module Z)
         a) If stoplights work, continue operation.
         b) If stoplights do not work, go to c.
   c. Check that taillight electrical connectors are connected to power sockets.
      1) If all taillight connectors are connected to taillight power sockets, tell T. C.
      2) If taillight connector is connected to dummy mount, plug connector to taillight power socket.
         a) If stoplights work, continue operation.
         b) If stoplights do not work, tell T. C.
2. To operate with normal headlights and taillights, push in and set LIGHTS switch to SERVICE lights. If headlights and taillights work, continue operation; if not, do a through c.
   a. Check hull networks box circuit breakers CB 21 and CB 22.
      1) If all circuit breakers are at ON position, go to b.
      2) If any circuit breaker is at OFF position, set it to ON.
         a) If service lights work, continue operation.
         b) If service lights do not work, go to b.

b. Check that service light lamp(s) is not burned out.
   1) If any lamp(s) is burned out, replace lamp. (See Module Z). If service lights now work, continue operation.
   2) If taillight(s) lamp is okay, and a taillight still does not work, go to c.
   3) If headlight(s) lamp is okay, and a headlight still does not work, tell T. C.

NOTE B: If tank is ready for infrared operation, end procedure here.

   4) If all lamps are okay, go to c.

c. Check that taillight electrical connectors are connected to power sockets.
   1) If taillight electrical connectors are connected to taillight power sockets, tell T. C.
   2) If taillight electrical connectors are connected to dummy mount, plug connector into taillight power socket.
      a) If service lights work, continue operation.
      b) If lights do not work, tell T. C.

3. To set headlight beams:
   a. For high beam headlights, set HI-BEAM switch (located on Driver's master panel) to ON.
      1) If HI BEAM light (located on Driver's master panel) and high beam headlights come on, continue operation.
      2) If HI BEAM light and high beam headlights don't come on, go to c.
   b. For low beam headlights, set HI BEAM switch to OFF.
      1) If HI BEAM light and high beam headlights go off, continue operation.
      2) If HI BEAM light and high beam headlights do not go off, go to c.
   c. If HI BEAM light and headlights do not respond properly to HI BEAM switch:
      1) Check hull networks box circuit breaker CB 21.
         a) If circuit breaker is at ON position, go to 2.
         b) If circuit breaker is at OFF position, set to ON.
            -If HI BEAM light and headlights respond porperly, continue operation.
            -If HI BEAM light and headlights do not respond properly, tell T. C.
      2) Check that high beam headlight(s) not working is not burned out.
         a) If both high beams are okay, tell T. C.
         b) If any high beams are burned out, replace headlight lamp (See Module Z).
            -If HI BEAM light and headlights respond properly, continue operation.
            -If HI BEAM light and headlights do not respond properly, tell T. C.

4. To operate with black out markers, set LIGHTS switch to BO. If blackout lights work, continue operation, if not, do a through c.
   a. Check hull networks box circuit breakers CB 21 and CB 22.
      1) If all circuit breakers are at ON position, go to b.
      2) If any circuit breaker is at OFF position, set to ON.
         a) If blackout lights work, continue operation.
         b) If blackout lights do not work, go to b.
   b. Check that BO light lamp(s) not working is not burned out.
      1) If all lamps are okay, go to c.
      2) If any lamps are burned out, replace lamp (See Module Z).
         a) If black out light's work, continue operation.
         b) If black out lights do not work, go to c.
   c. Check that taillight connectors are connected to power sockets.
      1) If taillight connectors are connected to power sockets, tell T. C.
      2) If taillight connectors are connected to dummy mount, plug connector into taillight power socket.
         a) If blackout lights work, conintue operation.
         b) If lights do not work, tell T. C.
5. When outside lights are no longer needed, set LIGHTS switch to OFF.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of step 5.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of step 5.
Accuracy - As indicated by:
. All outside lights responding properly to positioning of LIGHTS switch.
or . T. C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-100; pp. 3-44 to 3-46.

TASK 3K: OPERATE DRIVER'S NIGHT VISION VIEWER

CONDITIONS/STIMULUS

System State: Table K, Column 3K
Driver Location: In Driver's Station
Initiating Stimuli: Beginning of night operation

ACTION

Driver will:

1. To install night vision viewer:
   a. Unscrew wingnuts (located on ends of Driver's periscope).
   b. Remove middle periscope.
   c. Place periscope between legs.
   d. Open stowage box (located to left of Driver).
   e. Remove night vision viewer from stowage box.
   f. Push viewer into hole periscope was removed from, and hold.
   g. Tighten wingnuts (located on ends of Driver's periscopes) to hold viewer in place, then let go of viewer.
   h. Put periscope in stowage box.
   i. Close and lock cover of box.
   j. Check that viewer can be turned left or right freely. If not, tell T. C.

   NOTE A: VEHICLE MASTER POWER switch (located on Driver's master panel) must have been set to ON for night vision viewer to work on tank power.

2. To operate night vision viewer on tank power:
   a. Make sure NIGHT PERISCOPE switch (located on Driver's master panel) is set to OFF.
   b. Unscrew and remove battery cap (located on left side of viewer) from viewer.
   c. Make sure there is no battery in viewer.
   d. Screw battery cap on to viewer until tight.
   e. Unscrew and remove cap from plug (located below battery cap).
   f. Unscrew and remove connector on power cable from dummy plug (located behind and to the left of viewer).
   g. Screw power cable connector on to viewer plug until tight.
   h. Set NIGHT PERISCOPE switch to ON. If light (located above NIGHT PERISCOPE switch) comes on, go to i; if not, do 1) through 4).

NOTE B: If NIGHT PERISCOPE light does not light, but viewer works, replace light (see Task 2B).

1) Check night vision viewer power cable.
   a) If cable is OK, go to 2 .
   b) If cable is not connected to night vision viewer, connect cable.
      - If viewer works, go to L.
      - If viewer does not work, go to c.
   c) If cable is loose, tighten.
      - If viewer works, go to i.
      - If viewer does not work, go to 2.
2) Check cable connector and plug of night vision viewer.
   a) If connector and plug are clean, connect and go to Step 3.
   b) If connector or plug is dirty or corroded, clean and connect.
      - If viewer works, go to L.
      - If viewer does not work, go to 3.
3) Check hull networks box circuit breaker CB 2.
   a) If circuit breaker is at ON position, notify TC.
   b) If circuit breaker is at OFF position, set to ON.
      - If viewer works, go to i.
      - If viewer does not work, go to 4.
4) Attempt to operate on battery power (see Step 3).
   a) If viewer operates on battery power, tell TC and go to i.

i. Look at viewer screen.
j. Turn OFF-BRIGHT KNOB (located on left side of viewer) all the way toward BRIGHT.
k. If view on viewer screen is too bright, turn OFF-BRIGHT knob back toward OFF until view on screen is clearest.
l. Turn viewer left or right to see when making turns.

3. To operate night vision viewer on battery power:
   a. Make sure connector on power cable is screwed on to dummy plug (located behind and to the left of viewer).
   b. Make sure cap is screwed on to plug (located below battery cap).
   c. Unscrew and remove battery cap (located on left side of viewer).
   d. Put battery into viewer, (+) end first.
   e. Screw battery cap on to viewer until tight.
   f. Look at viewer screen.
   g. Turn OFF-BRIGHT knob all the way to BRIGHT.

h. If viewer does not work on battery power:
   1) Check battery installation.
      a) If battery is installed correctly; go to 2).
      b) If battery is installed in viewer wrong, install with (+) end first.
         -If viewer works, go to i.
         -If viewer does not work, go to 2.
   2) Clean dirty and/or corroded contacts and replace battery.
      a) If viewer works, go to i.
      b) If viewer does not work with new battery, tell T. C.

i. If view on screen is too weak, replace battery.(See a) If view on screen is too bright, turn knob back toward OFF until view on screen is clearest.

j. Turn viewer left or right to see when making turns.

4. To remove night vision viewer after operation on tank power:
   a. Set NIGHT PERISCOPE switch to OFF.
   b. Turn OFF - BRIGHT knob to OFF.
   c. Unscrew and remove power cable connector from viewer plug.
   d. Screw power cable connector on to dummy plug until tight.
   e. Screw cap on to viewer plug until tight.
   f. Unscrew wingnuts holding viewer in place.
   g. Remove viewer.
   h. Place viewer between legs.
   i. Open stowage box.
   j. Remove middle periscope from box.
   k. Put viewer in box.
   l. Close and lock box.
   m. Push middle periscope into hole viewer was removed from, and hold.
   n. Tighten wingnuts to hold periscope in place, then let go of periscope.

5. To remove night vision viewer after operation on battery power:
   a. Turn OFF - BRIGHT knob to OFF.
   b. Unscrew and remove battery cap.
   c. Remove battery.
   d. Screw battery cap on to viewer until tight.
   e. Unscrew wingnuts holding viewer in place.
   f. Remove viewer.
   g. Place viewer between legs.
   h. Open stowage box.
   i. Remove middle periscope from box.
   j. Put viewer in box.
   k. Close and lock box.
   l. Push middle periscope into hole the viewer was removed from, and hold.
   m. Tighten wingnuts to hold periscope in place, then let go of periscope.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of appropriate steps 1 through 5.

Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:

Time - Between end of initiating stimulus and completion of appropriate steps 1 through 5.

Accuracy - As indicated by:

- Night vision viewer working properly on tank or battery power.
- Night vision viewer stowed properly after use.

or

- T. C. notified

REFERENCES

TM 9-2350-255-10; p. 2-103 to p. 2-106, p. 3-69 to p. 3-70.

TASK 1L: SHUT DOWN ENGINE

CONDITIONS/STIMULUS

System State: Table L, Column 1L.
Driver Location: In Driver's station.
Initiating Stimuli: Order from TC to shut down engine (or other situation requiring engine shut down).

ACTION

Driver will:

1. Turn throttle to idle.
2. Press and hold service brake pedal to stop tank.
3. Set transmission control to N.
4. Engage parking brake.
5. Let go service brake pedal.
6. If PARKING/SERVICE BRAKE light (located on Driver's master panel) is lit, go to 7; if not, see task 3E.
7. Make sure TACTICAL IDLE switch (located on Driver's master panel) is set to OFF. Make sure following switches (located on Driver's master panel) are all set to OFF:
   a. PERSONNEL HEATER
   b. NIGHT PERISCOPE
   c. GAS PARTIC FILTER
   d. BILGE PUMP
   e. SMOKE GENERATOR
   f. Lights
   g. HI BEAM
8. Check that following lights (located on Driver's master panel) are all off; if not, tell TC.
   a. PERSONNEL HEATER
   b. NIGHT PERISCOPE
   c. GAS PARTIC FILTER
   d. BILGE PUMP
   e. SMOKE GENERATOR
   f. HI BEAM
9. Check that MASTER WARNING light (located on Driver's alert panel) is not lit. If light is lit, see Task 4F.
10. Check that MASTER CAUTION light (located on Driver's alert panel) is not lit. If light is lit, see Task 1F.
11. Check that lights on MAINTENANCE MONITOR (located on Driver's instrument panel) are not lit. If any lights are lit, see Task 1F.
12. Allow engine to idle for two minutes before shut-down.

13. Pull out and set ENGINE SHUTOFF switch down to SHUTOFF. Engine will coast to stop. If not, check hull networks box (located to right rear of Driver) circuit breaker CB7.

a. If circuit breaker is at ON position, tell TC.
b. If circuit breaker is at OFF position, set to ON. Engine should shut down. If not, tell TC.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As indicated by:
- Transmission control set to N.
- Parking brake engaged.
- Switches on Driver's master panel set to OFF.
- Lights on Driver's master panel set to OFF.
- Lights on Driver's alert panel set to OFF.
- Lights on Driver's MAINTENANCE MONITOR off.
- Engine shut off.

or
- TC notified.

REFERENCES

TM 9-2350-255-10; pp. 2-107 and 3-39.

TASK 1M: POWER DOWN HULL SYSTEMS

CONDITIONS/STIMULUS

System State: Table M, Column 1M.
Driver Location: In Driver's station.
Initiating Stimuli: Order from TC to power down hull system.

ACTION

Driver will:

1. Make sure that following switches located on Driver's master panel) are all set to OFF:
   a. PERSONNEL HEATER
   b. NIGHT PERISCOPE
   c. GAS PARTICLE FILTER
   d. BILGE PUMP
   e. SMOKE GENERATOR
   f. LIGHTS
   g. HI BEAM
   h. TACTICAL IDLE
2. Check that following lights (located on Driver's master panel) are all OFF; if not, tell TC:
   a. PERSONNEL HEATER
   b. NIGHT PERISCOPE
   c. GAS PARTIC FILTER
   d. BILGE PUMP
   e. SMOKE GENERATOR
   f. HI BEAM
3. Make sure that TANK SELECTOR switch (located on Driver's instrument panel) is set to REAR.
4. Move both drain valve handles (located to right of Driver's seat) up to OPEN.

   NOTE A: Vehicle master power will not shut off until engine has been shut down for more than 20 seconds.

5. Set and hold VEHICLE MASTER POWER switch (located on Driver's master panel) to OFF, then let it go.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 5.

Accuracy - As indicated by:

- Switches on Driver's master panel are set to OFF.
- Lights on Driver's master panel are OFF.
- TANK SELECTOR switch set to REAR.
- Drain valves OPEN.
- Hull power system off.

REFERENCES

TM 9-2350-255-10; p. 2-108.

TASK 1N: DO IMMEDIATE ACTION FOR LOSS OF ENGINE POWER

CONDITIONS/STIMULUS

System State: Table N, Column 1N.
Driver Location: In Driver's station.
Initiating Stimuli: Loss of engine power.

ACTION

Driver will:

NOTE A: Slow steering, weak service brakes or dead throttle are signs of loss of engine power.

1. Notify TC that engine power is lost.
2. Steer tank to clear, level area if possible.
3. If possible, allow tank to coast to a stop.
4. Engage parking brake.

NOTE B: Do Step 5 only if tank cannot coast to a stop without danger.

5. After tank slows to 7 km/h (4 mph) or less, push parking brake pedal (located at Driver's right foot) and stop tank.
6. Set transmission control to N.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by:
- Tank stopped
- Parking brake engaged.
- Transmission control in N position.
- TC notified.

REFERENCES

TM 9-2350-255-10; p. 2-322.

TASK 2N: DO IMMEDIATE ACTION FOR LOSS OF STEERING

CONDITIONS/STIMULUS

System State: Task N, Column 2N.
Driver Location: In Driver's station.
Initiating Stimuli: Loss of steering.

ACTION

Driver will:

1. Notify TC that steering is lost.
2. Turn throttle forward to idle position.
3. Make sure that TACTICAL IDLE switch (located on Driver's master panel) is set to OFF.
4. Push even and steady on service brake pedal (located at Driver's feet) and stop tank.
5. Engage parking brake pedal.
6. Set transmission control to N.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by:
- Tank stopped.
- Parking brake engaged.
- Transmission control at N position.
- TC notified.

REFERENCES

TM 9-2350-255-10; p. 2-322.

TASK 3N: DO IMMEDIATE ACTION FOR LOSS OF SERVICE BRAKES

CONDITIONS/STIMULUS

System State: Table N, Column 3N.
Driver Location: In Driver's station.
Initiating Stimuli: Loss of service brakes.

ACTION

Driver will:

1. Notify TC that service brakes do not work
2. Turn throttle forward to idle position.
3. Make sure that TACTICAL IDLE switch (located on Driver's master panel) is set to OFF.
4. Steer tank and allow tank to coast to stop.
5. Engage parking brake.

NOTE A: Do Step 6 only if tank cannot coast to a stop without danger.

6. After tank slows to 7 km/h (4 mph) or less, push parking brake pedal (located at Driver's right foot) and stop tank.
7. Set shift control to N.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 7.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 7.
Accuracy - As indicated by:
- Tank stopped.
- Parking brake engaged.
- Transmission control at N position.
- TC notified.

REFERENCES

TM 9-2350-255-10; p. 2-323.

TASK 6N: DO IMMEDIATE ACTION FOR THROTTLE CONTROL FAILURE

CONDITIONS/STIMULUS

System State: Table N, Column 1N.
Driver Location: In Driver's station.
Initiating Stimuli: Throttle control failure

ACTION

Driver will:

NOTE A: Throttle control failure is indicated by the engine not responding properly to the throttle handgrips being turned.

1. Check throttle failure as follows:
   a. Turn the throttle handgrips forward to idle position.
   b. Brake the tank (See Task 3E, Step 1 through 3).
   c. Set the transmission control shift to N.
   d. Turn the throttle handgrips rearward as far as they will go.
   e. Note that the engine RPM increases to 2400.
      1) If the engine RPM increases to 2400, go to f.
      2) If the engine RPM does not increase, the throttle has failed, and go to f and Step 2.
   f. Turn the throttle handgrips forward to the idle position.
   g. Note that the engine idles between 900 to 1000 RPM.
      1) If the engine idles between 900 to 1000 RPM, continue normal operations.
      2) If the engine does not idle between 900 and 1000 RPM, the throttle has failed and go to Step 2.
2. Tell T.C. that the throttle has failed.
3. Shut down the engine. (See Task 1L).

MEASUREMENT

During Training:
Time - Between the end of the initiating stimulus and completion of the appropriate step.
Accuracy - As indicated by the match between the steps given above and the appropriate steps performed by the Driver.

End of Training:
Time - Between the end of the initiating stimulus and completion of the appropriate step
Accuracy - As indicated by:
- The continuation of normal operations with throttle control working.

or
- The T.C. notified with engine shut down.

REFERENCES

SME Analysis

HUMRRO OBJECTIVES FOR DT/XM1 TASKS

TASK 1E: PLACE THE TANK IN MOTION

CONDITIONS/STIMULUS

System State: Table E, Column 1E, and after start checks completed.
Driver Location: In Driver's station.
Initiating Stimuli: TC tells Driver to move the tank.

ACTION

Driver will:

1. Turn LIGHTS switch to STOP LIGHT ONLY position.
2. Press service brake pedal (located directly below Steer-Throttle control) as far as it will go.
3. Release Parking Brake (See Task 4D, Step 5).
4. Move transmission shift control (located on Steer-Throttle control) to the needed gear as follows:
   a. Set shift control to N to idle engine with no movement and when starting up or shutting down engine.
   b. Set shift control to D to move tank foward no normal terrain.
   c. Set shift control to L for pulling heavy loads or for greatest power.
   d. Set shift control to PVT, and turn Steer-Throttle control (See Task 2E), when tank is stopped, to pivot the tank (engine speed will atomatically go to tactical idle).
   e. Set shift control to R (unless tank is moving forward to move tank rearward.
5. Release service brake pedal.
6. Put both hands on handgrips (located on Steer-Throttle control).
7. Twist grips rearward to move tank.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 7.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 7.
Accuracy - As indicated by:
*Tank moving in proper gear.

REFERENCES

TM 9-2350-255-10; pp. 2-92 and 2-93.

TASK 2E: STEER THE TANK

CONDITIONS/STIMULUS

System State: Table, Column 2E.
Driver Location: In Driver's station.
Initiating Stimuli: Completion of Task 1E, and, the need to steer the tank.

ACTION

Driver will:

1. Use Steer-Throttle control as steering bar to turn tank while driving forward as follows:
   a. Push right handgrip forward to turn the front of the tank to the left.
   b. Push left handgrip forward to turn the front of the tank to the right.
2. Turn tank while driving rearward as follows:
   a. Push right handgrip forward to turn the rear of the tank to the right.
   b. Push left handgrip forward to turn the rear of the tank to the left.
3. Pivot tank as follows:

   NOTE A: Transmission shift control must be set to PVT.

   a. Push right handgrip forward to pivot turn to left.
   b. Push left handgrip forward to pivot turn to right.
4. Place steering bar in its center position to drive tank in stright line.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of turn.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of turn.
Accuracy - As indicated by:
'The tank moving in the desired direction.

REFERENCES

TM 9-2350-255-10; pp. 2-93 and 2-94.

TASK 3E: BRAKE THE TANK

CONDITIONS/STIMULUS

System State: Table E, Column 3E.
Driver Location: In Driver's station.
Initiating Stimuli: Completion of Task 1E, and, the need to slow or stop the tank.

ACTION

Driver will:

1. Press Service brake pedal with either right or left foot.

   NOTE A: To apply Parking Brake when tank is not moving, do Steps 2 and 3.

2. Press in Parking Brake pedal with right foot.
3. Check that PARKING/SERVICE BRAKE ON light is on.

   NOTE B: If PARKING/SERVICE BRAKE ON light does not come on do Steps 4, 5 and 6.

4. Make sure Parking Brake pedal is pressed down all the way.
5. If PARKING/SERVICE BRAKE ON light comes on notify TC and continue operation, otherwise proceed to Step 6.
6. TEST PARKING/SERVICE BRAKE ON lamp as follows:
   a. Set transmission shift control to N.
   b. Pull parking brake release handle.
   c. Pull service brake pedal toward you.
   d. Press PANEL LIGHTS TEST button.
   e. Notify TC if PARKING/SERVICE BRAKE ON light comes on.
   f. Replace lamp (See Task 2B, Step 4) if PARKING/SERVICE BRAKE ON light does not light.

   NOTE C: To release Parking Brake (See Task 4D, Steps 5 and 6).

   NOTE D: If PARKING/SERVICE BRAKE ON light does not go out after Parking Brake release, and before service brakes have been engaged for two minutes, do Task 4D, steps 7 through 10.

NOTE E: If PARKING/DERVICE BRAKE ON light comes on with brakes released and tank running, do steps 7 through 10.

7. Pull service brake pedal toward you.
8. Notify TC and continue operation if PARKING/ SERVICE BRAKE light goes off.
9. Notify TC if service pedal brake is caught and light remains lit.
10. Check Parking Brake pedal (See Task 4D, Steps 7 through 10).

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of slow down or stop of tank.

Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:

Time - Between end of initiating stimuli and completion of slow down or stop of tank.

Accuracy - As indicated by:
- Tank slowed or stopped.
- SERVICE/PARKING BRAKE ON light on when Parking Brakes are engaged or when Service Brake is engaged for more than two minutes with engine running.
- SERVICE/PARKING BRAKE ON light off when Parking Brakes are released or engaged for less than two minutes with engine running.

Or
- TC notified.

REFERENCES

TM 9-2350-255-10; p.2-95; p. 3-16.

TASK 1I: OPERATE SMOKE GENERATOR

CONDITIONS/STIMULUS

System State: Table I, Column 1I.
Driver Location: In Driver's Station.
Initiating Stimuli: Command from T.C.

ACTION

Driver will:

NOTE A: Do not turn on SMOKE GENERATOR switch if tank is using MOGAS for fuel.

1. Drive in direction and at speed directed by T. C.
2. On command from T. C., pull out and set SMOKE GENERATOR switch (located on Driver's master panel) to ON. If SMOKE GENERATOR light comes on, go to Step 4; if not, do Step 3.
3. Check hull networks box circuit breaker CB23.
   a. If circuit breaker is at ON position, tell T. C.
   b. If circuit breaker is at OFF position, set to ON.
      1) If generator produces smoke and SMOKE GENERATOR light comes on, do step 4.
      2) If light and generator remain off, tell T. C.
4. On command from T. C., pull out and set SMOKE GENERATOR switch to OFF position.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 4.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 4.
Accuracy - As indicated by:
.SMOKE GENERATOR producing smoke properly.
or .T. C. notified

REFERENCES

TM 9-2350-255-10; p. 2-90, p. 3-66.

TASK 10: WALK TRACK INTO POSITION

CONDITIONS/STIMULUS

System State: Table 0, Column 10.
Driver Location: In Driver's Station.
Initiating Stimuli: Thrown Track.

ACTION

Driver will:

1. Shut down engine (see Task 1L).

   NOTE A: Skirts are heavy. Do not open two skirts 1 and 2, 3 and 4, 5 and 6 on the same hinge point at the same time. The skirts may fall and injure someone.

2. Open skirt Nos. 1, 2, 3, 4 and 5, one at a time to see thrown track.
   a. To open No. 1 skirt (located at front of tank):
      1) Open front fender (see Task 5X).
      2) Take out spring pin (located in hinge dowel) with pliers. Set spring pin aside for later use.
      3) Take out hinge dowel with pinch bar and hammer. Set dowel aside for later use.
      4) Unscrew skirt bolt three to four turns using 30 millimeter socket and handle.
      5) Lift swing hook out of position.
      6) Open No. 1 skirt.
   b. To open Nos. 2 and 3 or Nos. 4 and 5 skirts:
      1) Take out spring pin with pliers. Set spring pin aside for later use.
      2) Take out hinge dowel with pinch bar and hammer. Set dowel aside for later use.
      3) Open Nos. 2 and 3, or Nos. 4 and 5 skirts.

   NOTE B: If track is thrown completely off tank, disconnect track (see Task 2X) and prepare to install track (see Task 20).

3. Look at track and decide which direction (forward or backward) to walk track into position. If track tension cannot be released following step 4, dig hole under No. 1 road-wheel to allow roadarm to turn and unwind. Then do Step 4 again. If track tension still cannot be released, disconnect track (see Task 2X). If track breaks when thrown, or is disconnected, prepare to install track (see Task 20).
4. Release track tension (see Task 1X).
5. Start engine (see Task 1C).
6. With T.C. directing, move tank slowly about three feet in the direction that should walk track into position.

7. If thrown part of track starts walking back into position, do the following:
   a. On command from T.C. move tank slowly in the same direction until thrown part of track is walked back on.
   b. Adjust track tension (see Task 4X).
   c. Continue operation.
8. If more track is thrown when moving tank, do the following:
   a. On command from T.C. move tank slowly about three feet in the other direction.
   b. If thrown part of track starts to walk back into position, continue to move tank slowly in the same direction until thrown part walks back on.
   c. Adjust track tension (see Module Z).
   d. Continue operation.
9. If more track still comes off, shut down engine (see Task 1L). Disconnect track (see Task 2X) and prepare to install track (see Task 20).

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of Step 7, 8 or 9.

Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of Step 7, 8, or 9.

Accuracy - As indicated by:

. Track in position with tension adjusted.

OR . Engine shut down with track disconnected.

REFERENCES

TM 9-2350-255-10; p. 2-306 and p. 2-307, p. 3-108.

TASK 20: PREPARE TO INSTALL TRACK

CONDITIONS/STIMULUS

System State: Table O, Column 20
Driver Location: In Driver's Station
Initiating Stimuli: Completion of Task 10, step 9.

ACTION

Driver will:

1. Start engine (see Module C).
2. With other crewmember directing, back tank up until track come OFF sprocket (located on idler wheel) and lies flat on ground.
3. With other crewmember directing, move tank so that No. 7 roadwheel is over the thirteenth track link from the rear.

NOTE A: Sometimes it may be necessary to back tank completely off track. If so, do GET TANK ONTO TRACK (See Task 50) after checking suspension and installing track support chain.

4. Shut down engine. (See Module L)

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of step 4.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of step 4.
Accuracy - As indicated by:

.No. 7 road wheel over the thirteenth track link from rear.
.Engine shut down.

REFERENCES

TM 9-2350-255-10; p. 2-307.

TASK 30: CHECK SUSPENSION

CONDITIONS/STIMULUS

System State: See Table 0, Column 30.
Driver Location: Outside Tank.
Initiating Stimuli: Completion of Task 20.

ACTION

Driver will:

NOTE A: All crew members are needed to install track. Tank commander will direct crew members.

1. Open numbers 1, 3 and 5 skirts on thrown track side (See Task 10).
2. Unlatch and open front fender on thrown track side.
3. Look at compensating idler hub and arm assembly for cracks, breaks, or bends. If bad, tell T. C.
4. Look at track adjusting link (located between idler wheel and first road wheel) for cracks, breaks, or bends. If bad, tell T. C.
5. Check that both ends of track adjusting link are connected properly. If track adjusting link is not connected properly, tell T. C.
6. Look at compensating idler wheel for cracks, breaks, or oil leaks. If bad, tell T. C.
7. Look at number 1 hub and arm assembly (located on number 1 road wheel) for cracks, breaks, bending or oil leaks. If bad, tell T. C.
8. Look at skirt panel number 1 support skirt (located between number 1 road wheel and idler wheel) for breaks, bends, or other damage. If bad, tell T. C.
9. Look at number 1 road wheel for cracks, breaks, bending, or oil leaks. If bad, tell T.C.
10. Look at track support roller for cracks, and breaks. If bad, tell T. C.
11. Check that track support roller (outside portion of road wheel) is connected properly and can be turned by hand. If the support assembly is not connected properly or cannot be turned by hand, tell T. C.
12. Look at rear track support roller (inside portion of road wheel) for cracks, and breaks. If bad, tell T. C.
13. Check that rear track support roller is connected properly and can be turned by hand. If support assembly is not connected properly or cannot be turned by hand, tell T. C.

14. Look at number 3 and number 5 hub and arm assemblies for cracks, bends, breaks, or other damage. If bad, tell TC.
15. Look at number 3 and number 5 skirt support struts for cracks, breaks and if they are connected properly. If bad, tell TC.
16. Close skirt numbers 1, 3, and 5 (see Task 10).
17. Open rear side mud guard as follows:
    a. Remove retaining clip from hole in bottom of locking pin (located narrow end of mud guard).
    b. Take pin from hinge with pliers.
    c. Swing side mud gard open.
18. Open rear skirt number 6 (see Task 10).
19. Open skirt numbers 2 and 4 (see Task 10).
20. Look at number 2 hub and arm assembly (located on number 2 road wheels) for cracks, breaks, bends, or other damage. If bad, tell TC.
21. Look at numbers 4, 6, and 7 hub and arm assemblies (located on numbers 4, 6, and 7 road wheels) for cracks, breaks, bends, or other damage. If bad, tell T. C.
22. Look at numbers 2, 4, and 6 road wheels for cracks, breaks, or other damage. If bad, tell T. C.
23. Look at number 7 road wheel for cracks, breaks or other damage. If bad, tell T. C.
24. Look at hub and sprocket assembly (located on drive wheel) for cracks, breaks, bends and other damage. If bad, tell T. C.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of step 24.

Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of step 24.

Accuracy - As indicated by:

.All idler wheel hubs, arm assemblies, and wheels are good.
.Track adjusting links are connected properly.
.All roadwheel hubs, arm assemblies and wheels are good.
.All skirt panel support struts are good.
.All track support rollers are good, connected properly and able to be turned by hand.
.Drive wheel hub and sprocket assembly are good.

or .T. C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-308 to p. 2-311.

TASK 40: INSTALL TRACK SUPPORT CHAIN

CONDITIONS/STIMULUS

System State: Table 0, Column 40
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 30.

ACTION

Driver will:

1. Clean openings in brackets on side of tank (located behind idler wheel and in front of drive wheel).
2. Take out track support chain assembly from left sponson box (located on side of turret).
3. Slide rear chain post assembly into rear bracket (located in front of drive wheel).
4. Lay chain assembly across top of support roller housing behind support roller wheels (located above road wheels).
5. Slide front chain post assembly into front bracket.
6. Put painted chain link into chain locking hook and tighten chain using locking ratchet arm.
7. If chain is not tight, loosen locking ratchet arm. Put next chain link after painted link into chain locking hook and tighten chain again.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of step 7.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of step 7.
Accuracy - As indicated by:

.Track support chain tight, above support roller wheels, extending between front and rear brackets.

REFERENCES

TM 9-2350-255-10; p. 2-312.

TASK 50: GET TANK ONTO TRACK

CONDITIONS/STIMULUS

System State: Table 0, Column 50.
Driver Location: Outside tank.
Initiating Stimuli: Tank completely off track and completion of Task 40.

ACTION

Driver will:

NOTE A: This task is only used if the tank is completely off the track.

1. Put crowbar between track pin and end connector of first track shoe. Push track down to ground just before number one road wheel goes onto track.
2. Start engine (see Module C).
3. Carefully drive tank forward onto track.
4. Stop tank when road wheel No. 7 is over thirteenth track link counting from rear end of track.
5. Shut down engine (see Module L) and engage parking brake.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:
- Road wheel No. 7 over thirteenth track link.
- Engine shut down.

REFERENCES

TM 9-2350-255-10; pp. 2-312 to 2-313.

TASK 60: GET TRACK ONTO DRIVE SPROCKET

CONDITIONS/STIMULUS

System State: Table 0, Column 60
Driver Location: Outside tank.
Initiating Stimuli: Completion of Task 40 or if tank was completely off track, Task 50.

ACTION

Driver will:

1. Tie rope to center of rear link pin of track at back of tank.
2. Raise rear of track by hand as high as possible.
3. Keep rope taut and take two turns with rope around drive hub in clockwise direction (for right hand track) (counterclockwise for left hand track), and pass loose end through opening in hub of drive wheel.
4. Have rope pulled and kept taut.
5. Start engine (see Module C).
6. Put transmission shift control to PVT.
7. Release parking brakes and slowly pivot steer tank in direction of good track until loose track is resting on top of drive sprockets on drive wheel.
8. Shut down engine (see Module L).
9. Take off rope from hub and track link pin.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 9.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 9.
Accuracy - As indicated by:
- Loose track resting on top of drive sprockets.
- Engine shut down.
- Rope off hub and track link pin.

REFERENCES

TM 9-2350-255-10; p. 2-313.

TASK 70: MOVE TRACK OVER IDLER WHEEL

CONDITIONS/STIMULUS

System State: Table 0, Column 70.
Driver Location: In Driver's station.
Initiating Stimuli: Completion of Task 60.

ACTION

Driver will:

1. Start engine (see Module C).
2. Set transmission shift control to L.
3. Release parking brake.
4. Move tank slowly forward in a straight line, six feet at a time.
5. Stop when free end of track contacts front of track support chain post assembly (located at bracket near idler wheel). Carefully lift end of track over chain post assembly, if required.
6. Move tank slowly forward while carefully guiding track over compensating idler wheel.
7. Stop tank when No. 1 road wheel is on fifth link from the end of track on the grounds.
8. Shut down engine (see Module L).
9. Connect track. (see Module X)

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 9.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 9.
Accuracy - As indicated by:
. Track connected and over idler wheel.

REFERENCES

TM 9-2350-255-10; p. 2-314.

TASK 80: REMOVE TRACK SUPPORT CHAIN

CONDITIONS/STIMULUS

System State: Table 0, Column 80.
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 70.

ACTION

Driver will:
1. Open chain ratchet locking arm.
2. Slide front chain past assembly out of bracket (located near idler wheel).
3. Slide rear chain post assembly out of bracket (located near drive wheel).
4. Take off track support chain assembly and stow in left sponson box (located on tank turret).

MEASUREMENT

During Training
- Time - Between end of initiating stimulus and completion of Step 4.
- Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training
- Time - Between end of initiating stimulus and completion of Step 4.
- Accuracy - As indicated by:
  - . Track support chain stowed in left sponson box.

REFERENCES

TM 9-2350-255-10; p. 2-314.

TASK 90: CHECK TRACK PARTS

CONDITIONS/STIMULUS

System State: Table O, Column 90.
Driver Location: Outside tank.
Initiating Stimuli: Completion of Task 80.

ACTION

Driver will:

1. Check all center guides and center guide nuts (located on track). If okay, go to Step 2. If bad, remove (a through j) and install replacements (k through n) as follows:

NOTE A: Tank should be parked on level ground.

a. Start engine (see Task 1C).
b. Have crewmember outside tank look at centerguide that is to be removed.
c. With outside crewmember directing, move tank forward or rearward until centerguide to be removed is midway between idler wheel and No. 1 roadwheel.
d. When centerguide is in position, shut down engine (see Task 1L).
e. Set and hold VEHICLE MASTER POWER switch (located on Driver's Master Panel) to OFF.
f. When VEHICLE MASTER POWER light (located above switch) goes OFF, let go of switch. If light does not go OFF, tell T.C.
g. Loosen centerguide nut (located in middle of centerguide) about two turns, using 30 millimeter socket, handle, and extension.
h. Hit centerguide and bolt (located in middle of centerguide) with ball peen hammer, until inner half and outer half of centerguide are loose.
i. Unscrew and remove nut, bolt, inner half, and outer half of centerguide, using 30 millimeter socket, handle, and extension.
j. Check nut, bolt, inner half, and outer half of centerguide for bends or damaged threads. If bad, replace. If okay, set aside for later use.
k. Put centerguide bolt through outer half of centerguide.
l. Put outer half of centerguide over track link pins from outside of track.
m. Put inner half of centerguide over centerguide bolt sticking through the track.
n. Screw centerguide nut on bolt until tight, using 30 millimeter socket, handle, and extension.

NOTE B: Have organizational maintenance torque the bolts as soon as possible.

2. Check all end connectors, end connector wedges and bolts (located on the outside edges of the trucks). If okay go to Step 3; if bad, remove (a through s) and install replacements. (t through an) as follows:

NOTE C: Tank should be parked on level ground.

a. Start engine (see Task 1C).
b. Have crewmember outside tank watch end connector (located on track edge) that is to be removed.
c. With crewmember outside tank directing, move tank forward or rearward until end connector to be removed is midway between idler wheel (located at front of tank) and No. 1 road-wheel.
d. When end connector is in position, shut down engine (see Task 1L).
e. Set and hold VEHICLE MASTER POWER switch (located on Driver's Master panel) to OFF.
f. When VEHICLE MASTER POWER light (located above switch) goes OFF, let go of switch. If light does not go off, tell T.C.
g. Clean area around head of screw holding the end connector.
h. Unscrew screw about three turns, using 30 millimeter socket and handle.
i. Hit head of screw with sledge hammer until wedge on other side of connector is loose.
j. Loosen and remove screw and wedge, using 30 millimeter socket and handle.
k. Get rid of screw and wedge.
l. Put hook of end connector puller behind end connector.
m. Aline two studs on puller with two link pins of end connector.
n. Pump handle of puller until gap between end connector and track links is about one inch.
o. Put track connecting fixture between end connector and track links.
p. Hook jaws of fixture around two link pins of end connector.
q. Turn screw of track connecting fixture until jaws are tight, using 30 millimeter socket and handle.
r. Pump handle of end connector puller until end connector comes off.
s. If okay, set aside for later use; if bad, turn in end connector for replacement.

NOTE D: Adjust track connector fixture, using 30 millimeter socket and handle, if necessary, to fit end connector on link pins.

t. Put end connector on two link pins with round hole of end connector up.
u. Hit end connector with sledge hammer until gap between end connector and jaws of track connecting fixture is about 1/8 inch.
v. Turn screw of fixture, using 30 millimeter socket and handle, until fixture jaws are loose.
w. Remove track connecting fixture from two link pins.
x. Hit end connector with sledge hammer until seated against track links.
y. Put new wedge for the end connector screw in hole on outside of end connector.
z. Put new screw through end connector and into wedge.
aa. Tighten screw into wedge, using 30 millimeter socket and handle.
ab. Start engine (see Task 1C).
ac. Have crewmember outside tank watch upper edge of track link that is below end connector being installed.
ad. With crewmember outside tank directing, move tank rearward until upper edge of track link that is below end connector being installed, just touches idler wheel (located to front of roadwheel No.1).
ae. When track link that is below end connector being installed is in position, push parking brake pedal (located to Driver's right foot) all the way.
af. Tighten end connector screw using 30 millimeter socket and handle.
ag. Pull parking brake release handle (located to Driver's right side), then let it go.
ah. Move tank forward about six feet.
ai. Have crewmember outside tank watch upper edge of track link that is just below end connector being installed.
aj. With crewmember outside tank directing, move tank rearward until upper edge of track link just below end connector being installed, just touches idler wheel (located forward of No. 1 roadwheel).
ak. When track link just below end connector being installed is in position, push parking brake pedal all the way.
al. Tighten end connector screw using 30 millimeter socket and handle.

am. Tighten screw in end connector across from end connector that is being installed, using 30 millimeter socket and handle.

an. Mark end connector screw and end connector that is being installed, using paint and brush.

NOTE E: Have organizational maintenance tighten end connector screws on end connector being installed and the one across from it to required torque as soon as possible. About 32 km of operation after organizational maintenance tighten screws, have organizational maintenance tighten screws to required torque again.

3. Check track shoes (or links). If okay, go to Step 4; if not remove (a through h) and install replacement (j through n).

NOTE F: Tank should be parked on level ground.

a. Start engine (see Task 1C).
b. Have crewmember outside tank watch track link that is to be removed.
c. With crewmember outside tank directing, move tank forward or rearward until track link to be removed is midway between idler wheel (located to forward of No. 1 roadwheel) and No. 1 roadwheel.
d. When track link to be removed is in position, shut down engine (see Task 1L).
e. Disconnect track (see Task 2X) at track link to be removed.
f. Remove centerguide (located in middle of track) still attached to track link to be removed (see Step 1).
g. Remove end connectors still attached to track link to be removed (see Step 2).
h. Pull track link to be removed from track.
i. Connect track (see Task 3X) if not installing new track link.
j. Put new track link on front of track with pattern on bottom of new track link pointing the same direction as pattern on bottom of remaining track links.
k. Install end connectors to attach new link (see Step 2).
l. Mark end connector and end connector screw attaching the new link using paint and brush.
m. Install centerguide in middle of track (see Step 1).
n. Connect track (see Task 3X).

4. Adjust track tension (see Task 4X).

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of Step 4.

Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of Step 4.

Accuracy - As indicated by:

- Track in position.
- All track parts okay.
- Track adjusted to correct tension.

REFERENCES

TM 9-2350-255-10; p. 2-314, p. 3-120 to p. 3-126, p. 3-128.

TASK 1Q: DRIVE TANK UP AND DOWN HILLS

CONDITIONS/STIMULUS

System State: Table Q, Column 1Q.
Driver Location: In Driver's Station.
Initiating Stimuli: Hilly Terrain.

ACTION

Driver will:

NOTE A: In any gear, there is no drag from engine to slow or stop tank. Brakes must be used to slow and stop tank.

1. Drive tank straight up hill, if possible.
2. Set transmission control (located on Steer-Throttle control) to L if forward speed cannot be kept.
3. Use brakes to stop tank on hill (see Task 3E).
4. Drive down hill in same gear used to drive up hill.
5. Drive straight down hill, if possible.
6. Use brakes to keep safe speed (see Task 3E).

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by the match between steps given above and steps performed by Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by:

- Tank successfully driven up and down hill.

REFERENCES

TM 9-2350-255-10; p. 2-97.

TASK 2Q: DRIVE TANK OVER OBSTACLE

CONDITIONS/STIMULUS

System State: Table Q, Column 2Q
Driver Location: In Driver's Station
Initiating Stimuli: Appearance of Obstacle Which Cannot be Avoided.

ACTION

Driver will:

1. Alert crew that obstacle will be crossed.
2. Have T.C. elevate main gun all the way.
3. Slow down tank (by using brakes (see Task 3E)) and set transmission control (located on Steer-Throttle Column) to L.
4. Drive tank slowly to meet forward edge of obstacle.
5. Increase speed and drive up obstacle.
6. Slow down tank (see Step 3) as it gets to balance point.
7. Drive forward slowly to ease tank forward from balance point.
8. Drive down off obstacle slowly, using service brakes to control speed.
9. When tracks touch ground, increase speed.
10. When rear of tank if off obstacle continue normal driving.
11. Have T.C. depress main gun.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 11.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 11.
Accuracy - As indicated by:
. Tank successfully driven over obstacle.

REFERENCES

TM 9-2350-255-10; p. 2-98.

TASK 3Q: DRIVE TANK ACROSS DITCH

CONDITIONS/STIMULUS

System State: Table Q, Column 3Q
Driver Location: In Driver's Station
Initiating Stimuli: Appearance of Ditch Which Must Be Crossed

ACTION

Driver will:

1. Alert crew that ditch will be crossed.
2. Have T.C. elevate main gun all the way.
3. Slow down tank by pressing the Service brake pedal with either foot and set transmission control to L.
4. Drive tank slowly to meet ditch with both tracks at edge of opening.
5. Drive slowly into ditch.
6. When front of tracks touch far side of ditch increase speed.
7. Slow down tank as it gets to balance point (see Step 3).
8. Drive forward slowly to ease tank forward from balance point.
9. When front of tank touches ground, continue normal driving.
10. Have T.C. depress main gun.

MEASUREMENT

D ring Training

Time - Between end of initiating stimulus and completion of Step 10.
Accuracy - As indicated by the match between steps given above and steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of Step 10.
Accuracy - As indicated by:

. Tank successfully driven across ditch.

REFERENCES

TM 9-2350-255-10; p. 2-99.

TASK 2U: OPERATE TANK ON SAND OR MUD

CONDITIONS/STIMULUS

System State: Table U, Column 2U
Driver Location: In Driver's Station
Initiating Stimuli: Terrain of Sand or Mud and Completion of Module E

ACTION

Driver will:

1. Turn throttle handgrips (located on steer-throttle control) slowly to change speed, do not spin tracks.
2. Do not make pivot turns.
3. Do not straddle sand mounds or drive on sides of two sand mounds. Loose sand will not support tank on steep slopes.
4. Keep throttle handgrips (located on Steer- Throttle control) steady after tank reaches desired speed.
5. Turn tank slowly when on loose sand or mud.
6. Steer tank straight up and down hills if possible.
7. To move tank forward and turn after tank is stopped in loose sand or mud 12 inches (30.4 mm) or deeper, do the following:
   a. Set transmission control (located on Steer-Throttle control) to R.
   b. Turn throttle handgrips back and move tank straight back about 20 feet.
   c. Push on service brake pedal (located by Driver's feet) and twist throttle handgrips forward to idle position.
   d. Set transmission control to L.
   e. Release the service brake pedal, turn throttle handgrips back, and move tank forward
   f. Turn tank gradually.
8. Listen for track popping when driving tank zigzag over deep loose sand or mud 12 inches (30.4 mm) or deeper. If popping is heard, drive tank in straight line until popping stops. If popping does not stop, do the following:
   a. Press on service brake pedal and stop tank.
   b. Press parking brake pedal (located near Driver's right foot) then let go.
   c. Have track and suspension checked for sticking sand or mud.
   d. If track or suspension has more sand or or mud sticking to it than normal, move tank about 15 feet (4.6 m) backward and forward two or three times to clean suspension track.

9. If tank starts to skid, do the following:
   a. Turn throttle handgrips forward to idle position.
   b. Steer in direction of skid until tank stops skidding.
   c. Turn throttle handgrips back slowly and steer tank on a straight course.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of appropriate Step.
Accuracy - As measured by the match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimulus and completion of appropriate Step.
Accuracy - As indicated by:
. Tank operating properly on sand or mud without track popping.

REFERENCES

TM 9-2350-255-10; p. 2-288.

TASK 1Y: FORD SHALLOW WATER

CONDITIONS/STIMULUS

System State: Table Y, Column 1Y
Driver Location: In Driver's Station
Initiating Stimuli: Need to ford water obstacle less than four feet deep

ACTION

Driver will:

1. Stop tank at edge of water.
2. Set TACTICAL IDLE switch (located on Driver's master panel) to ON.
3. Spread drain valve handles (located near Driver's right hand) and push down to close.
4. Release service brake pedal (located between Driver's feet).
5. Drive tank slowly into water.
6. If tank must be stopped when fording water, do the following:
   a. Press on service brake pedal and hold after tank stops.
   b. Release service brake pedal to start tank moving.
7. Drive tank at 5 to 6 km/h (3 to 4 mph) or less through water.
8. If tank accidently enters water deeper than 4 feet, quickly do the following:

   NOTE A: If engine stops do not try and restart. Tell T.C. and tow tank (See Module S) as soon as possible.

   a. Press on service brake pedal and hold after tank stops.
   b. Set transmission control (located on steer-throttle control) to R.
   c. Release service brake pedal.
   d. Slowly drive tank out of deep water.
9. If more than 1 foot of water was forded and tank is not under combat after leaving water, do the following:
   a. Shut down engine (See Task 1L).
   b. Open left and right No. 1 skirts (see Task 1O).
   c. Check idler wheels and roadwheel hub for water in oil (milky look). If water is in oil, tell T.C.
   d. Close left and right No. 1 skirts (see Task 3X).

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 7 (or 8, or 9).
Accuracy - As measured by the match between steps given above and steps performed by the driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 7 (or 8, or 9).
Accuracy - As indicated by:

- Tank on correct side of water obstacle less than four feet deep.
- Tank backed out of water obstacle deeper than four feet.
- Oil of wheels o.k.

OR
- T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-289 to p. 2-290.

HUMRRO OBJECTIVES FOR XM1 TASKS

TASK 1A: ENTER DRIVER'S STATION

CONDITIONS/STIMULUS

System State: Table A, Column 1A; and hatches closed and secure, and keys for hatch padlocks.
Driver Location: Outside Tank.
Initiating Stimuli: TC tells Driver to prepare station for operation.

ACTION

Driver will:

1. Mount tank using step on forward left skirt panel and handhold.
2. Unlock Loader's hatch (padlock).
3. Grab handle on hatch and move hatch to full open position.
4. Move hatch toward closed position to check that hatch-open lock is hooked.
5. Enter tank through Loader's hatch, stepping on loader's seat, then down to turret floor.
6. Check that turret traverse lock is in locked position (handle displays LOCKED).
7. Check that Turret Power switch on commander's panel is set to OFF.

NOTE A: WARNING: Do not extend any part of body from turret into Driver's compartment or from Driver's compartment into turret unless turret traverse lock is locked.

8. Swing Loader's toeguard out of way.
9. Fold Driver's upper seat back down by pushing seat back lever forward and pushing seat back down.
10. Enter Driver's compartment.

NOTE B: Driver's headrest must be in up position to enter Driver's compartment.

11. Check that VEHICLE MASTER POWER switch on Driver's master panel (located to forward right of Driver) is in OFF position.
12. Check that Parking Brake is engaged by pushing Parking Brake pedal with foot (located at Driver's right foot).
13. Turn dome light lever (location above Driver) to white light (for day operations) by moving lever away from the red mark on dome light housing; or, to red light (for night operations) by moving lever toward red mark on dome light housing.

14. Turn dome light knob clockwise to increase light or counter clockwise to decrease or shut off light.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 14.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 14.
Accuracy - As indicated by:

- *Turret traverse lock is in locked positions.
- *Turret Power switch on Commander's panel is set to OFF.
- *VEHICLE MASTER Power switch on Driver's master panel is OFF.
- *Parking brake is engaged.
- *Dome light is on.
- *Turret dome light lever on white light for day operations or red light for night operations.

REFERENCES

DEP 9-2350-255-10-1; p2-62 & 2-63.
DEP 9-2350-255-10-2; pp, 2-27 to 2-29.

TASK 2A: OPEN DRIVER'S HATCH, ADJUST DRIVER'S SEAT AND PERISCOPES

CONDITIONS/SITIMULUS

System State: Table A, Column 2A.
Driver Location: In Driver's Station.
Initiating Stimuli: Task 1A is completed.

ACTION

Driver will:

1. For open hatch operation, open Driver's hatch as follows:

   NOTE A: WARNING Do not open driver's hatch while vehicle is moving except in case of emergency. If you must operate hatch while vehicle is moving use extreme care. Driver's hatch is heavy and can cause injury.

   a. Reach over right shoulder with right hand and grasp driver's hatch lifting handle.
   b. Push button on lifting handle with right thumb and raise handle until handle stops.
   c. Let go of button and handle. (Hatch is now in raised position.)
   d. Reach across body with left hand and grasp hatch hand crank on bottom of hatch mechanism.
   e. Squeeze handle crank and turn clockwise until hatch locks.

2. Raise Driver's seat for open hatch operation as follows:

   a. Pull back up/down lever to raise seat (located to forward of left side of seat).
   b. Push lever forward to drop seat down.

3. Adjust driver's seat as follows:

   a. Set desired height of Driver's seat as follows:

      1) Unlock seat spring by pushing lever (location to middle of right side of seat) toward seat with right palm.
      2) Control up and down movement of seat with body weight while pushing lever as in 1).
      3) Release lever in 1) to lock seat in place.

   b. Set desired upper seat back angle as follows:

1) Move upper seat back lever (located to bottom left side of upper seat back) forward.
2) Control movement of upper seat back with body weight while holding upper seat back lever forward as in 1).
3) Release upper seat back lever in 1) to lock upper seat back.

c. Set desired lower back support as follows:

1) Turn top of knob (located on left side of Driver's seat) forward to increase lower back support.
2) Turn top of knob in 1) to rear to decrease lower back support.

d. Set desired headrest position as follows:

1) Pull Driver's headrest down with left hand. (Headrest is spring loaded.)
2) Turn position lock knob (location to rear of headrest support) with right hand for adjustment.

NOTE : Perform Step 4 for closed hatch operation.

4. Adjust Driver's periscopes as follows:

a. Grasp knobs on both sides of periscope to be adjusted and turn toward you to loosen mirror.
b. Move mirror until front slope of tank shows in bottom of scope.
c. Turn knobs away from you to tighten mirror.

NOTE : Perform step 5 if center periscope is dirty.

5. Clean center periscope as follows:

a. Push rubber foot button (located at Driver's left foot) until fluid squirts on periscope.
b. Grasp Driver's periscope wiper lever (located to front of center periscope) and move left and right until periscope is clear.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 3 (or Step 4 if closed hatch operation; or Step 5 if center periscope is dirty).

Accuracy - As indicated by match between steps given above and steps performed by Driver.

Time - Between end of initiating stimuli and the completion of Step 3 (or Step 4 if closed hatch operation; or Step 5 if center periscope is dirty).

End of Training:

Accuracy - As indicated by:

- Driver's hatch open in locked position
- Driver's seat raised for open hatch operation.
- Driver seat adjusted as desired.
- Periscope adjusted to permit viewing front slope of tank in bottom of scope (if closed hatch operation).
- Center periscope clean.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-63 to 2-64.

TASK 3A: CHECK TURRET SEAL AND DRAIN VALVES

CONDITIONS/STIMULUS

System State: Table A, Column 3A;
Driver Location: In Driver's station.
Initiating Stimuli: Task 2A is complete.

ACTION

Driver will:

1. Check turret seal as follows:
   a. Check for zero pressure reading on turret inflatable seal pressure gage (located to Driver's left.)

   NOTE A: If gage does not show zero pressure; bleed pressure by unscrewing bleed cock (located on seal pressure gage) until zero pressure is shown.

2. Check drain valves as follows:
   a. Check that drain valve handles (located to Driver's right side) are in open position.
   b. Open drain valve handles, if closed, by lifting handles to open notch.

   NOTE B: Have other personnel check under hull for leaks.

   c. Push drain valve handles to closed position.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 2.
Accuracy - As indicated by match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 2.
Accuracy - As indicated by:
- Zero reading on turret inflatable seal pressure gage.
- Driver's compartment drained with drain valve handles closed.

REFERENCES

TM 9-2350-255-10 p. 2-72.

TASK 2C: START ENGINE - ABORTED START

CONDITIONS/STIMULUS

System State: Table C, Column 2C.
Driver Location: In Driver's Station.
Initiating STimuli: Task 1C, is completed and ABORT light (located on Driver's master panel) is on.

ACTION

Driver will:

1. Wait until ABORT light goes out, then repeat normal start (TASK 1C).
2. If engine does not start, wait 60 seconds.

NOTE A: If weather is very cold (-25° or colder), do Steps 3 and 4. In warmer weather, proceed to Step 5.

3. Press in START button and release it.
4. Hold in START button until engine starts or one minute passes.
5. Hold STARTER ONLY switch (located on Driver's master panel) to ENGAGED for 20 to 30 seconds.
6. When engine stops turing and RPM gage indicated 0 RPM, press START button for about 1 second.

NOTE B: Tell TC if engine does not start.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 6.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training:
Time - Between end of initiating stimuli and completion of Step 6.
Accuracy - As indicated by:
- Running engine or notification of TC that engine does not start.

REFERENCES

DEP 9-2350-255-10-1; p. 2-74.

TASK 5G: OPERATE PORTABLE FIRE EXTINGUISHERS

CONDITIONS/STIMULUS

System State: Table G, Column 5G.
Driver Location: In Driver's Station or outside tank.
Initiating Stimuli: Fire in tank not put out by engine or crew compartment extinguishers.

ACTION

Driver will:

1. Get portable extinguishers from racks under T. C.'s seat and/or left stowage box (located outside tank).
2. Break wire and pull out pin (located on extinguisher trigger).
3. Pull extinguisher horn up to level position.
4. Take fire extinguisher as close to the fire as possible and point horn directly at base of flames.
5. Press down and hold trigger to shoot fire extinguisher.

   NOTE A: If fire was inside tank, open all hatches after fire is extinguished and let tank air out for five minutes before continuing operation.

6. Put pin back into trigger.
7. Turn horn down.
8. Tag fire extinguisher with word EMPTY.

   NOTE B: Replace empty fire extinguisher as soon as possible.

MEASUREMENT

During Training

Time - Between detection of initiating stimuli and completion of Step 8.
Accuracy - As indicated by match between steps given above and steps performed by Driver.

End of Training

Time - Between detection of initiating stimuli and completion of Step 8.
Accuracy - As indicated by:

- .Fire extinguished.
- .Extinguisher pins in place.
- .Used extinguishers tagged EMPTY.
- .Tank aired out if fire was inside tank.

REFERENCES

TM 9-2350-255-10; p. 2-77.

TASK 2K: USE INFRARED LENSES

CONDITIONS/STIMULUS

System State: Table K, Column 2K.
Driver Location: In Driver's Station.
Initiating Stimuli: When infrared light source is needed.

ACTION

Driver will:

1. Remove two infrared headlight lenses from stowage box located under Commander's arm rest.
2. On outside of tank, use screwdriver to unscrew and remove four screws and washers from headlight. Set aside for later use.
3. Remove lens holder plate from headlight.
4. Remove packing material from one infrared lens and set aside for later use.
5. Put infrared lens into headlight so curve of lens faces toward front of headlight.
6. Put lens holder plate over infrared lens and, using screwdriver, screw in the four screws and washers until tight.
7. Repeat steps 2 through 6 for other side headlight.
8. Stow packaging material removed from infrared lenses in stowage box under Commander's arm rest.
9. At back of tank, reach through hole in top of taillight guard.
10. Remove cap from dummy plug.
11. Remove connector from taillight plug.
12. Put connector on dummy plug.
13. Put cap on taillight plug.
14. Repeat steps 9 through 13 for other side taillight.
15. Turn on headlights (see Task 1K).
16. Check that headlights are working by feeling infrared lenses with hand. Heat should be felt. If no heat is felt, headlight is not working. Replace headlight lamp (see Module Z).
    a. If headlights work, go to 17.
    b. If headlights do not work, see Task 1K, step 2).
17. Use night vision viewer (see Task 3K).
18. When infrared lenses are no longer needed:
    a. Remove infrared lenses.
    b. Install clear lenses.
    c. Stow infrared lenses.
    d. Put connector back on taillight plug.
    e. Put cap back on dummy plug.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 18.
Accuracy - As indicated by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 18.
Accuracy - As indicated by:

- Headlights working properly with infrared lenses in place.
- Infrared lenses stowed properly after use.
- Taillights working properly after infrared lense use.
- T. C. notified.

REFERENCES

TM 9-2350-255-10; p. 2-101 to p. 2-102, p. 3-44.

TASK 2M: CLOSE DRIVER'S HATCH

CONDITIONS/STIMULUS

System State: Table A, Column 2M
Driver Location: In Driver's station.
Initiating Stimuli: Order from TC to secure Driver's station.

ACTION

Driver will:

1. Lower seat to closed hatch position (see Task 2A).
2. Turn and hold hatch latch using left hand.
3. Squeeze hatch hand crank (located to right of Driver) using right hand.
4. Turn hand crank counterclockwise about one turn.
5. Let go of hatch latch.
6. Turn hand crank counterclockwise until hatch is over opening.
7. Let go of hand crank.
8. Reach over right shoulder with right hand and grasp hatch lifting handle (located to right of hatch opening).
9. Press and hold button (located on hatch lifting handle).
10. Pull down handle until it snaps into clip (located to right of Driver's master panel), then let go.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 10.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 10.
Accuracy - Accuracy as indicated by:
. Hatch closed.
. Lifting handle in clip.

REFERENCES

TM 9-2350-255-10; p. 2-109.

TASK 3M: EXIT DRIVER'S STATION

CONDITIONS/STIMULUS

System State: Table M, Column 3M.
Driver Location: In Driver's station.
Initiating Stimuli: Order from TC to secure Driver's station.

ACTION

Driver will:

1. Have turret crewmember position main gun over back deck and lock turret traverse lock.
2. Lower upper seat back (see Task 2A).
3. Raise headrest (see Task 2A).
4. Be sure turret crewmember has locked turret traverse lock before you move from Driver's seat.
5. Move out of Driver's seat and into turret.
6. Exit hatch through loader's hatch

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by:
. Driver outside tank.

REFERENCES

TM 9-2350-255-10; p. 2-109.

TASK 4N: REMOVE INJURED CREWMEMBER THROUGH LOADER'S HATCH

CONDITIONS/STIMULUS

System State: Table N, Column 4N.
Driver Location: In Driver's station.
Initiating Stimuli: Detection of need to remove injured crewmember.

ACTION

Driver will:

1. Have two crewmembers in turret move injured crewmember to area under loader's hatch.
2. Have one crewmember get on turret open loader's hatch.
3. Have third crewmember get on turret next to loader's hatch opening.
4. Have two crewmembers in turret lift injured crewmember up so that crewmember on turret can grasp injured crewmember.
5. All three crewmembers then lift injured crewmember through turret opening. Lay injured crewmember in turret, and give first aid.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:
. Injured crewmember laying on turret.

REFERENCES

TM 9-2350-255-10; p. 2-326.

TASK 5N: DECONTAMINATE TANK

CONDITIONS/STIMULUS

System State: Table N, Column 5N.
Driver Location: In Driver's station.
Initiating Stimuli: Contamination of tank.

ACTION

Driver will:

1. If outside of tank becomes contaminated during a chemical or biological attack, do the following:
   a. Get decontamination spray container from side of ammunition box (located to left of TC seat).
   b. Open loader's hatch and spray outside turret roof around loader's hatch.

   NOTE A: Get containers from left and right sponson boxes (located on sides of turret) as needed.

   c. Exit tank and spray left sponson box handle, rear top deck grille door handles, rear fuel tank caps, right sponson box handle, Driver's hatch, front fuel tank caps, crewmember tank mounting handle, loader's hatch, loader's machinegun controls, commander's hatch, and commander's machinegun controls.
2. If inside of tank becomes contaminated during a chemical or biological attack, do the following:
   a. Decontaminate outside of tank (see Step 1).
   b. Spray Driver's, loader's, gunner's and commander's controls that are used to operate stations.
   c. Spray all gun sights and head rests.
   d. Spray Driver's, loader's gunner's, and commander's seats and controls.
   e. Spray Driver's, loader's, and commander's hatches.

   NOTE B: When time permits, decontaminate complete tank.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 1 (or Step 2).
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 1 (or Step 2).

Accuracy - As indicated by:

. Noted parts of tank sprayed with decontamination spray.

REFERENCES

TM 9-2350-255-10; p. 2-331.

TASK 1P: TAKE ACTION WHEN ENGINE DOES NOT CRANK

CONDITIONS/STIMULUS

System State: Table P, Column 1P.
Driver Location: In Driver's Station.
Initiating Stimuli: Engine Does Not Crank During Start Up.

ACTION

Driver will:

1. Check hull networks box (located to rear right side of Driver) circuit breaker CB 7, CB 9 and CB 10.
   a. If all circuit breakers are in ON position, go to Step 2.
   b. If any circuit breaker is at OFF position, set to ON.
      1.) If engine cranks, continue normal operation.
      2.) If engine does not crank, go to Step 2.
2. Check battery condition indicators as follows:
   a. Make sure batte-ies have been serviced as follows:

   NOTE A: Remove all jewelry and identification tags when servicing batteries.

      1.) Have turret crewmember traverse turret manually so main gun is over left side of tank.
      2.) Have turret crewmember lock turret traverse lock.
      3.) Pull handle on rear battery cover (located on top right rear of tank) straight up.
      4.) Slide handle forward.
      5.) Lift rear battery cover and swing it all the way out.
      6.) Lift front battery cover (located forward of rear battery cover).
      7.) Swing front battery cover out all the way.
      8.) Clean tops of batteries using wiping rag.
      9.) Check following items for corrosion: terminals, cables, clamps, battery hold downs (located on sides of batteries), and bus bars (located on top of batteries). If corrosion is found, tell T. C.
      10.) Check following items for tightness: cables, clamps, battery hold downs, and bus bars; if loose, tell T.C.
      11.) Make sure washers are on terminals below clamps; if missing, tell T.C.
      12.) Check insulation on all cables. If cracked, cut, or rubbed through, tell T.C.
      13.) Check all battery condition indicators (located on top of batteries, one for each cell).
      14.) If any battery condition indicator is missing, tell T.C.

NOTE B: During routine servicing of batteries (with engine cranking), if all battery condition indicators show green, continue normal operation after closing battery covers (go to Step 1J, h through k).

15.) If all battery condition indicators show green, check all cable connectors (at power pack disconnect panel).

a.) If any cable connectors are loose, tighten connectors.

1.) If engine cranks, continue normal operation after closing battery covers (See Step 17,h-k).

2.) If engine does not crank, tell T.C.

b.) If any connector cannot be tightened, tell T.C.

c.) If all connectors are tight, tell T.C.

16.) If battery condition indicator shows clear, tell T.C.

NOTE C: On command from T.C. add clean, clear water to cell of clear battery condition indicator.

17.) If any battery condition indicator shows black, charge batteries.

a.) Slave start engine (see Module R).

c.) Set TACTICAL IDLE switch (located on Driver's Master panel) to ON.

d.) Run engine for about 15 minutes.

e.) Check LOW BAT CHARGE light (located on Driver's instrument panel) after 15 minutes. If light is not lit, continue normal operation. If light is lit, go to Step f.

f.) Shut down engine (see Task 1L).

g.) Check battery condition indicators and do following steps:

1.) If any battery indicator shows black, tell T.C.

2.) If no battery indicator shows black, start engine (see Task 1C C for normal start, or Module R for slave start), set TACTICAL IDLE switch to ON and run engine about 15 minutes to finish charging.

h.) Swing front battery cover in and down to top deck.

i.) Swing rear battery cover in and down to top deck.

j.) Slide handle back into keeper (located to rear of tank).

k.) Pull handle down on to rear battery cover to lock.

MEASUREMENT

During Training	Time - Between end of initiating stimulus and completion of Step 2. Accuracy - As indicated by the match between steps given above and appropriate steps performed by the Driver.
End of Training	Time - Between end of initiating stimulus and completion of Step 2. Accuracy - As indicated by: . Engine cranking normally. OR . T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 3-34 to p. 3-35, p. 3-103 to p. 3-107.

TASK 2P: TAKE ACTION WHEN ENGINE CRANKS BUT DOES NOT START

CONDITIONS/STIMULUS

System State: Table P, Column 2P.
Driver Location: In Driver's Station.
Initiating Stimuli: Engine Cranks But Does Not Start.

ACTION

Driver will:

1. Check hull networks box circuit breakers CB 12 and CB 13.
   a. If any circuit breaker is at OFF position, set to ON.
      1.) If engine starts, continue normal operation.
      2.) If engine does not start, go to Step 2.
   b. If all circuit breakers are at ON position, go to Step 2.
2. Set FUEL TANK SELECTOR switch (located on Driver's instrument panel) to REAR and check LOW FUEL LEVEL light.
   a. If light is lit, transfer fuel (see Task 3F).
      1.) If engine starts, continue normal operation.
      2.) If engine does not start, go to Step 3.
   b. If light is not lit, go to Step 3.
3. Check battery condition indicators (see Task 1P).
   a. If engine starts, continue normal operation.
   b. If engine does not start, with all indicators showing green, go to Step 4.
4. Check AIR CLEANER FILTER CLOGGED light (located on Driver's instrument panel).
   a. If light is lit, service precleaner and air cleaner filter as follows:
      1.) Shut down engine (see Task 1L).
      2.) Make sure parking brake is set (see Task 4D).
      3.) Have loader traverse turret to service precleaner and air cleaner filters.
      4.) Have loader make sure traverse lock is locked.
      5.) Open left side precleaner covers (located on top of rear deck) as follows:
         a) Grasp precleaner cover handle and turn straight up.
         b) Slide handle to rear of tank.
         c) Lift rear precleaner cover and swing it all the way out.
         d) Grasp handle on front precleaner cover.
         e) Lift front precleaner cover and swing it all the way out.
      6.) Open left side rear grille doors as follows:
         a) Open left side rear precleaner cover (see a to e above).

b) Grasp left rear grille door (located to rear of precleaner cover) and swing all the way to rear.
c) Grasp right rear grille door and swing all the way to rear.

7.) Unscrew and take off six thumb screws from exposed screen.
8.) Take off screen from precleaner.
9.) Clean dirt and leaves from screen and precleaner.
10.) Wipe screen surfaces with clean, dry rag.
11.) Put screen on precleaner.
12.) Screw in and tighten six thumb screws on screen.
13.) Close left side rear grille doors as follows:
a) Grasp right rear grille door and swing forward to close.
b) Grasp left rear grille door and swing forward to close.
14.) Close left side precleaner cover as follows:
a) Grasp front precleaner cover handle and swing front precleaner cover to close.
b) Grasp rear precleaner cover handle and swing rear precleaner cover to close.
c) Slide rear precleaner cover forward into lock.
d) Turn rear precleaner cover to side, then let go.
15.) Start engine (see Task 1C).
a) If engine starts, continue normal operation.
b) If engine does not start, go to 16.
16.) Check AIR CLEANER FILTER CLOGGED caution light.

NOTE A: During regular precleaner and air cleaner filters maintenance with engine starting normally, if AIR CLEANER FILTER CLOGGED caution light is off or flickers, continue normal operation.

a) If light is off or flickers, and engine starts, continue normal operation.
b) If light is off or flickers and engine does not start, go to step 5.
c) If light remains on, continue with 17.)
17.) Shut down engine (see Task 1L).
18.) Open left side precleaner covers (see 5.), a) to e) above).
19.) Open left side rear grille doors (see 6.), a) to e) above).
20.) Grasp four latches (located on sides of precleaner) and pull out and down from precleaner.

21.) Grasp handles (located on top sides) on precleaner.

NOTE B: Do not bend flexible hose (located at rear of precleaner) more than 60 degrees.

22.) Lift off precleaner from air filters (located below precleaner) and set on top deck.

23.) Mark each air filter using lead pencil as follows:
   a) Mark L on left air filter.
   b) Mark C on center air filter.
   c) Mark R on right air filter.

24.) Lift three clamp handles (located to rear of filters) straight up.

25.) Grasp left air filter (closest to side of tank) handles and lift air filter straight up and out of baffle box in which it is located.

26.) Grasp center air filter handles and slide center air filter all the way to left side of baffle box.

27.) Lift center air filter straight up and out of baffle box.

28.) Grasp right air filter (closest to tank center) handles and slide right air filter all the way to left side of baffle box.

29.) Lift right air filter straight up and out of baffle box.

30.) Look at air filters for holes, dents, and tears. If bad, tell T.C.

31.) Look at bead on front face (wider end) of air filters for dents. If bad, tell T.C.

32.) Look at rear face (narrower end) of filters for buckling. If bad, tell T.C.

NOTE C: Do not bounce air filters on hard surface to remove dirt. Do not allow dirt and dust to fall into baffle box when cleaning air filters.

33.) Shake and hand brush dirt and dust from air filters.

34.) If possible, use compressed air to clean air filters.

35.) If necessary, tap narrow end of air filter on ground to shake out dust and dirt.

36.) If air filters are badly clogged, tell T.C.

37.) Look at baffle box seals (located inside box toward tank front) for rips or tears. If bad, tell T.C.

38.) Clean baffle box and baffle box seals.

39.) Grasp right air filter handles and put right air filter in left side of baffle box with wide end toward tank front.

40.) Slide right air filter all the way to right side in baffle box.
41.) Grasp center air filter handles and put center air filter in left side of baffle box with wide end toward tank front.
42.) Slide center air filter to right until centered in baffle box.
43.) Grasp left air filter handles and put left air filter in left side of baffle box with wide end toward tank front.
44.) Square three air filters at all ends and lower three locking handles to hold air filters.
45.) Look at top and bottom precleaner rubber seals for rips or tears. If bad, tell T.C.
46.) Set precleaner on baffle box.
47.) Hook four latch nuts (located on ends of precleaner) under four air cleaner hooks (located on ends of baffle box).
48.) Pull four latches all the way up to snap into place.
49.) Close left side rear grille doors (see 13) above.
50.) Close left side precleaner covers (see 14) above.
51.) Start engine (see Task 1C).
a) If engine starts, continue normal operation.
b) If engine does not start, go to 52.
52.) Check AIR CLEANER FILTER CLOGGED caution light.

NOTE D: During regular precleaner and air cleaner filters maintenance with engine starting normally, if AIR CLEANER FILTER CLOGGED caution light if off or flickers, continue normal operation.

a) If light is off or flickers and engine starts, continue normal operation.
b) If light is off or flickers and engine does not start, go to Step 5.
c) If light remains on, tell T.C.

5. Check air intake grille doors (located on left rear side of tank deck) for obstructions.
a. If blocked, clear obstructions.
1.) If engine starts, continue normal operation.
2.) If engine does not start, go to Step 6.
b. If clear, go to Step 6.
6. Check FUEL/WATER SEP FILTER CLOGGED light (located on Driver's instrument panel).
a. If light is lit, go to Step 7.
b. If light is not lit, go to Step 8.

7. Open right top deck grille doors (follow directions for opening left side rear grille doors, see Step 4, 6) above).
   a. If gage shows fuel/water separator is okay, go to Step 8.
   b. If gage shows fuel/water separator is dirty, tell T.C.
8. Check manual fuel shut-off valve.
   a. If manual fuel shut-off valve is closed, open valve.
      1. If engine starts, continue normal operation.
      2. If engine does not start, tell T.C.
   b. If manual fuel-shutoff valve is open, tell T.C.

MEASUREMENT

During Training
Time - Between end of initiating stimulus and completion of necessary steps.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training
Time - Between end of initiating stimulus and completion of necessary steps.
Accuracy - As indicated by:
. Engine starts normally
OR . T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 3-35 to p. 3-36, p. 3-93 to p. 3-98.

TASK 3P: TAKE ACTION WHEN ENGINE OPERATES WITH REDUCED POWER

CONDITIONS/STIMULUS

System State: Table P, Column 3P
Driver Location: In Driver's Station
Initiating Stimuli: Engine Operates With Reduced Power

ACTION

Driver will:

1. Check FUEL/WATER SEP FILTER CLOGGED light (located on Driver's instrument panel).
   a. If light is lit, go to Step 2.
   b. If light is off, go to Step 3.
2. Open right top deck grille door (follow directions for opening left side rear grille doors, Task 2P, Step 4) and check filter clogged gage on fuel/water separator.
   a. If fuel/water separator is clogged, tell T.C.
   b. If fuel/water separator is not clogged, go to Step 3.

   NOTE A: When FUEL/WATER SEP FILTER CLOGGED light lights, open bypass valve. Tank can be driven about another 50 km (approximately 30 miles) on level ground or about 25 km (approximately 15 miles) on hilly ground without great power loss.

3. Check AIR CLEANER FILTER CLOGGED light (located on Driver's instrument panel).
   a. If light is lit, service precleaner and air cleaner filters (see Task 2P, Step 4).
      1.) If engine operates at normal power, continue normal operation.
      2.) If engine operates at reduced power, go to Step 4.
   b. If light is not lit, go to Step 4.
4. If power loss continues, operate with caution at reduced power and tell T.C.

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by:

. Engine running at normal speed.
OR . T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 3-38.

TASK 4P: TAKE ACTION WHEN ENGINE SHTS DOWN AUTOMATICALLY

CONDITIONS/STIMULUS

System State: Table P, Column 4P.
Driver Location: In Driver's Location.
Initiating Stimuli: Engine Shuts down Automatically.

ACTION

Driver will:

1. Check fuel gage.
   a. If rear tank is empty, transfer fuel (see Task 3F) and restart engine (see Task 1C).
      1.) If engine starts, continue normal operation.
      2.) If engine does not start, go to Step 2.
   b. If rear tank has fuel, go to Step 2.
2. Check ENGINE OIL LOW light.
   a. If light is lit, tell T.C. and check engine oil level.
   b. If light is not lit, tell T.C.

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by the match between the steps given above and appropriate steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by:

. Engine running properly.
OR . T.C. notified.

REFERENCES

TM 9-2350-255-10; p. 3-39.

TASK 5P: TAKE ACTION WHEN ENGINE DOES NOT SHUT DOWN

CONDITIONS/STIMULUS

System State: Table P, Column 5P.
Driver Location: In Driver's station.
Initiating Stimuli: Engine Does Not Shut Down.

ACTION

Driver will:

1. Pull out and set ENGINE SHUTOFF switch down to SHUTOFF. Engine will coast to stop. If not, check hull networks box (located to right rear of Driver) circuit breaker CB7.
   a. If circuit breaker is at ON position, tell TC.
   b. If circuit breaker is at OFF position, set to ON. Engine should shut down. If not, tell TC.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by the match between the step above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of necessary step.
Accuracy - As indicated by:

- Engine shut down.
- TC notified.

REFERENCES

TM 0-2350-255-10; p. 3-39.

TASK 1R: PREPARE TANKS TO START DEAD TANK

CONDITIONS/STIMULUS

System State: Table R, Column 1R
Driver Location: In Driver's Station
Initiating Stimuli: Tank Will Not Start Due to Dead Battery

ACTION

Driver will:

NOTE A: Two crews are used in this procedure. Driver of live tank does steps for live tank and driver of dead tank does steps for dead tank.

1. Prepare dead tank as follows:
   a. Press parking brake (located at Driver's right foot) all the way down, then let go.
   b. Make sure transmission control (located on Steer-Throttle control) is set to N.
   c. Make sure TACTICAL IDLE switch (located on Driver's master panel) is set to OFF.
   d. Make sure the following switches (located on Driver's master panel) are set to OFF:
      (1) PERSONNEL HEATER
      (2) NIGHT PERISCOPE
      (3) GAS PARTIC FILTER
      (4) BILGE PUMP
      (5) SMOKE GENERATOR
      (6) LIGHTS
      (7) HI BEAM
   e. Set circuit breaker CB 13 in hull networks box (located at Driver's right shoulder) to OFF.
   f. Make sure ENGINE SHUTOFF switch (located on Driver's master panel) is UP.
   g. Make sure VEHICLE MASTER POWER switch (located on Driver's master panel) is set to OFF.
   h. Open battery covers (see Task 1P, Step 2a).
   i. Service batteries (see Task 1P, Step 2a).
   j. Close battery covers (see Task 1P, Step 2.)
   k. Have loader manually traverse turret so main gun is over back deck.
   l. Have loader lock turret traverse lock.
2. Prepare live tank as follows:
   a. Start engine (see Task 1C).
   b. Have loader traverse turret so main gun is over back deck.
   c. Have loader lock traverse lock.
3. Position live tank as follows:
   a. Park live tank alongside dead tank so that driver's compartments are as close to each other as possible.
   b. Shut down engine (see Task 1L).
   c. Set VEHICLE MASTER POWER switch to OFF until its light goes out, then let go.

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of Step 3.

Accuracy - As indicated by the match between steps given above and steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of Step 3.

Accuracy - As indicated by:

- Dead tank shut down
- CB 13 of dead tank is OFF
- VEHICLE MASTER POWER switch of dead tank is set to OFF
- Batteries of dead tank serviced
- Battery covers of dead tank closed
- Turrets of dead and live trunks traversed so main guns are over back decks
- Turrets of dead and live tanks locked
- Live tank shut down, parked alongside dead tank
- VEHICLE MASTER POWER switch of live tank set to OFF

REFERENCES

TM 9-2350-255-10; p. 2-269 to 2-270.

TASK 2R: START DEAD TANK

CONDITIONS/STIMULUS

System State: Table R, Column 2R
Driver Location: In Driver's Station
Initiating Stimuli: Completion of Task 1R

ACTION

Driver will:

1. Take off slave receptacle caps (located at Driver's right shoulder) from receptacles in live and dead tank.

   NOTE A: Get slave cable from organizational maintenance.

2. Take off two caps from slave cable.
3. Have a crewmember hand one end of slave cable to each driver.
4. Push your end of slave cable straight on to slave receptacle without touching end on any part of tank when one end is connected.
5. Set live tank VEHICLE MASTER POWER switch (located on Driver's master panel) to ON.
6. Look at dead tank VEHICLE MASTER POWER light (located on Driver's master panel). If light is lit, tell T.C.
7. Set dead tank VEHICLE MASTER POWER switch to ON.
8. Check that dead tank PARKING/SERVICE BRAKE light (located on Driver's master panel) is lit. If not lit, do troubleshooting (see Task 3E).
9. Check that dead tank MASTER WARNING light (located on Driver's alert panel) is not lit. If it is lit, do immediate action (see Task 4F).
10. Check that dead tank MASTER CAUTION light (located on Driver's alert panel) is not lit. If it is lit, do immediate action (see Task 1F).
11. Start live tank (see Task 1C).
12. Set live tank TACTICAL IDLE switch (located on Driver's master panel) to ON.
13. Let live tank idle 15 minutes to charge dead tank batteries.

    NOTE B: Do not attempt to start dead tank if yellow LOW BAT CHARGE light (located on Driver's instrument panel) on live tank is lit. If light is lit, do troubleshooting (see Task 1F).

14. Start dead tank (see Task 1C).
15. After dead tank starts, pull slave cable straight off slave receptacles on both live and dead tank, without touching connector ends to any part of tank when one end is connected.

16. Put caps back on slave cable ends and on receptacles in each tank.
17. Set TACTICAL IDLE switch of original live tank to OFF.
18. Set circuit breaker CB 13 in hull networks box of restarted tank to ON.
19. Make after-start checks on restarted tank (see Task 1D).

NOTE C: If restarted tank is not to be driven for extended period, run engine at TACTICAL IDLE for at least 30 minutes to charge batteries.

MEASUREMENT

During Training

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As indicated by the match between steps given above and steps performed by the Driver.

End of Training

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As indicated by:

- Both tanks running
- Slave cables removed
- Receptacle caps in place
- TACTICAL IDLE switch of original live tank set to OFF
- Circuit breaker CB 13 in restarted tank set to ON
- After start checks made on restarted tank

REFERENCES

TM 9-2350-255-10; p. 2-271 to p. 2-272.

TASK 1S: DISCONNECT FINAL DRIVES

CONDITIONS/STIMULUS

System State: Table S, Column 1S
Driver Location: Outside Tank
Initiating Stimuli: Disabled Tank in Need of Tow Farther than One Mile (1.6 km) and/or if Engine or Transmission of Disabled Tank is Bad

ACTION

Driver will:

1. Open side mudguard (located at rear of tank) (see Task 30, step 17).
2. Place two wood blocks under front and rear of each track.
3. Unscrew and take off three screws from cover (located in center of final drive sprocket) with 15 millimeter socket, extension and handle.
4. Pull cover off adapter (located in center of final drive sprocket).
5. Unscrew and take off center bolt and retainer from adapter with 18 millimeter socket, extension and handle.
6. Pull adapter off final drive sprocket. If adapter will not come off sprocket by pulling, do the following steps:
   a. Screw in and hand tighten two of three screws removed from cover in two jack screw holes on adapter.
   b. Tighten two screws (in a) evenly, to break loose adapter from sprocket, with 15 millimeter socket, extension and handle.
   c. Pull adapter from center of sprocket.
   d. Unscrew and take off two screws from adapter.
7. Make sure two packings are in grooves on each side of adapter. If not, do the following:
   a. Find packings.
   b. Look at packings for cuts. If bad, replace.
   c. Push two packings in grooves on each side of adapter.
8. Turn adapter around and slide on shaft (located in center of final drive sprocket) with bearing end of adapter pointing away from the tank.
9. Screw in adapter center bolt and retainer to shaft with 18 millimeter socket, extension and handle until final drive releases from transmission.

10. Tighten center bolt until snug then about 1/4 turn more.
11. Place cover on adapter and line up holes in cover, adapter, and hub (located in center of final drive sprocket).
12. Screw in and tighten three screws (removed in Step 3) on cover with 15 millimeter socket, extension and handle.
13. Close side mud guard (see Task 4X, step 30.)
14. Do Steps 1 through 13 to disconnect final drive on other side of tank.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 14.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of step 14.
Accuracy - As indicated by:

- Final drives disconnected
- Adapter center bolt tight
- Adapter cover in place
- Mud guards closed

REFERENCES

TM 9-2350-255-10; p. 2-273 to p. 2-274.

TASK 2S: CONNECT TOW BAR

CONDITIONS/STIMULUS

System State: Table S, Column 2S
Driver Location: In Driver's Station
Initiating Stimuli: Disabled Tank in Need of Tow

ACTION

Driver will:

NOTE A: Four crewmembers and one driver are needed to connect tow bar. Get tow bar from organizational maintenance.

1. Look at tow bar for broken welds or cracks. If bad, tell T.C.
2. Have loader traverse turret manually on disabled tank so that main gun is over rear deck of tank.
3. Have loader lock turret traverse lock.
4. Remove two clip pins from two pins on two connectors (located on two ends of tow bar).

NOTE B: Tow bar must have handles and flat side of three pins (located at three ends of bar) pointing up.

5. Have three crewmembers grasp tow bar and slide two connectors over two lower tow eyes on front of disabled tank.
6. Line up holes in two connectors of tow bar with two lower tow eyes on tank.
7. Put two pins through connectors.
8. Put two locking pins in two pins placed through the two connectors.
9. Start engine of tow tank (see Task 1C).
10. Have loader traverse turret of tow tank so that main gun is over front of tow tank.
11. Have loader lock turret traverse lock on tow tank.
12. Remove cotter pin (located on side of pintle) from pintler on the rear of tow tank.
13. Pull release latch on top of pintle away from tow tank and hold. Pull up on top of pintle until it locks open.
14. Have two crewmembers grasp tow bar handles and raise tow bar connecting eye slightly higher than pintle on tow tank.
15. With two crewmembers, one at each end of tow tank directing, back up tow tank slowly and line up pintle with tow bar connecting eye.

16. Engage tow tank parking brakes.
17. Lower tow bar connecting eye onto pintle of tow tank.
18. Pull release latch on top of pintle away from tow tank so that top of pintle drops and locks tow bar to pintle.
19. Put cotter pin in pintle.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As indicated by:

- Tow bar connected to tow eyes of disabled tank with locking pins in place.
- Tow bar connected to pintle of tow tank with cotter pin in place.
- No cracks or broken welds in tow bar.

REFERENCES

TM 9-2350-255-10; p. 2-274 to p. 2-276.

TASK 3S: TOW TANK WITH TOW BAR

CONDITIONS/STIMULUS

System State: Table S, Column 3S
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 2S

ACTION

Driver will:

NOTE A: If engine or transmission of disabled tank is bad, or if disabled tank is to be towed more than one mile (1.6 kms), disconnect final drives (see Task 1S).

1. Take four wood blocks away from under each end of both tracks on disabled tank.
2. Enter driver's station of disabled tank (see Task 1A).
3. Check that driver's hatch on disabled tank is closed. If not, close hatch (see Task 2M).
4. If final drives are connected, pull on parking brake release handle (located to right of Driver) on disabled tank to release parking brake.

NOTE B: Do not tow disabled tank at more than 5 km/h (3 mph) when final drives are disconnected or 18 km/h (8 mph) when final drives are connected.

5. Drive tow tank to tow disabled tank (see Module E).

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:

- Disabled tank being towed
- Driver's hatch on disabled tank closed
- Parking brake of disabled tank released if final drives are connected.

REFERENCES

TM 9-2350-255-10; p. 2-280.

TASK 4S: DISCONNECT TOW BAR

CONDITIONS/STIMULUS

System State: Table S, Column 4S
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 3S

ACTION

Driver will:

NOTE A: Four crewmembers are needed to disconnect tow bar.

1. Put wood blocks under each end of both tracks on disabled tank.
2. Take out cotter pin (located on side of pintle) from pintle on rear of tow tank.
3. Pull pintle release latch away from tow tank and take off tow bar from pintle.
4. Push pintle release latch on pintle toward tow tank and push down on top of pintle until it closes.
5. Put cotter pin back into side of pintle.
6. Take off two locking pins from two pins securing tow bar on two lower tow eyes on front of disabled tank.
7. Have three crewmembers grasp tow bar.
8. Take off two pins from two connectors connecting tow bar to disabled tank.
9. Move tow bar away from disabled tank.
10. Slide two pins into two connectors on ends of tow bar.
11. Put two locking pins in two pins in connectors on ends of tow bar.
12. Turn in tow bar to organizational maintenance.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 12.

Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 12.

Accuracy - As indicated by:
- Pins in place on tow bar
- Pin locking pins in place
- Tow bar turned into organizational maintence

REFERENCES

TM 9-2350-255-10; p. 2-282.

TASK 5S: CONNECT TOW CABLES

CONDITIONS/STIMULUS

System State: Table S, Column 5S
Driver Location: Outside Tank
Initiating Stimuli: Disabled Tank in Need of Tow

ACTION

Driver will:

NOTE A: Four crewmembers and one driver are needed to connect tow cables.

NOTE B: To tow disabled tank with final drives connected, only one tank is used.

NOTE C: To tow disabled tank with final drives disconnected, two tanks are used. One tank is used for towing and second tank is used for braking.

1. Make sure wood blocks are under each of both tracks on disabled tank.
2. Pull two tow cables out of clips attaching them to each side of turret on disabled tank.
3. Pull back on two tow cable rear eyes (located to rear of turret) one on each side of turret on disabled tank, and remove rear eyes from rear retainers.
4. Turn two tow cable front eyes (located to front of turret), one on each side of turret on disabled tank, 1/4 turn and remove front eyes from front hooks on side of turret.
5. Put cable connecting hooks on disabled tank and tow tank as follows:
   a. Get two cable connecting hooks, two hook pins and four locking pins from left sponson box on side of each tank.
   b. Put two cable connecting hooks over two bottom front tow eyes on disabled tank with hooks pointing away from disabled tank.
   c. Put in and center two hook pins to attach cable connecting hooks to tow eyes.
   d. Put four locking pins on two hook pins, one on each end.
   e. Put two cable connecting hooks over two bottom rear tow eyes on tow tank with hooks pointing away from tow tank.

f. Put in and center two hook pins to attach cable connecting hooks to tow eyes.
g. Put four locking pins on two hook pins, one on each end.

6. Have loader traverse turret manually on disabled tank so that main gun is over rear deck of tank.
7. Have loader lock turret traverse lock on disabled tank.
8. Put one end of each tow cable over two hooks on front of disabled tank and turn 1/4 turn away from disabled tank.
9. Have other ends of two tow cables pulled straight and crossed, and lay tow cables on ground.
10. Start engine of tow tank (see Task 1C).
11. Have loader traverse turret on tow tank so that main gun is over front of tow tank.
12. Have loader lock turret traverse lock.
13. With two crewmembers, one in front and one in rear of tow tank directing, back tow tank up slowly so that rear hooks are over ends of two tow cables.
14. Press parking brake pedal (located near Driver's right foot) of tow tank as far as it will go, then let go.
15. Have two tow cable ends put over rear hooks of tow tank and turned 1/4 turn away from tow tank.
16. Make sure tow cables are not looped over hooks. If so, have tow cables straightened.
17. Release tow tank parking brake.
18. With two remaining crewmembers, one at each end of tow tank directing, drive tow tank to slowly take up slack in tow cables.
19. Press parking brake pedal of tow tank as far as it will go, then let go.
20. If engine and transmission on disabled tank are okay and tank is to be towed less than one mile (1.6 kms), tow disabled tank (see Task 6S). If engine or transmission on disabled tank are bad or if tank is to be towed more than one mile (1.6 kms), do step 21.
21. Connect brake tank to disabled tank as follows:
    a. Have loader traverse brake tank turret so main gun is over rear of tank and lock traverse turret locks.
    b. Pull tow cable out of clips attaching it to side of turret on brake tank.

c. Pull back on tow cable rear eye and remove rear eye from rear retainer (located to rear of turret).
d. Turn tow cable front eye (located to front of turret) 1/4 turn and remove front eye from front hooks on side of turret.
e. Repeat Step 5 for putting hook pin and two lockpins on left rear of disabled tank and left front of brake tank.
f. Repeat steps 8 through 19 to connect cable to left rear of disabled tank and left front of brake tank.
g. Tow disabled tank (see Task 6S).

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 20 (or 21)
Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

Time - Between end of initiating stimulus and completion of Step 20 (or 21).
Accuracy - As indicated by:

- Cables properly attached, crossed, to disabled tank and tow tank.
- Disabled tank towed by tow tank.
- If engine or transmission on disabled tank are bad or if tank is to be towed more than one mile (1.6 kms): cable properly attached to disabled tank and second brake tank.

REFERENCES

TM 9-2350-255-10; p. 2-276 to p. 2-279.

TASK 6S: TOW TANK WITH TOW CABLES

CONDITIONS/STIMULUS

System State: Table S, Column 6S
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 5S

ACTION

Driver will:

NOTE A: If engine or transmission of disabled tank is bad, or if disabled tank is to be towed more than one mile (1.6 kms), disconnect final drives (see Task 1S).

1. Take four wood blocks away from under each end of both tracks on disabled tank.
2. Enter driver's station of disabled (see Task 1A).
3. Check that driver's hatch on disabled tank is closed. If not, close hatch (see Task 2M).
4. If final drives are connected, pull on parking brake release handle on disabled tank to release parking brake.

NOTE B: Do not tow disabled tank at more than 5 km/h (3 mph) when final drives are disconnected or 18 km/h (8 mph) when final drives are connected.

5. Drive tow tank to tow disabled tank (see Module E). If final drives are disconnected on disabled tank, driver of brake tank brakes disabled tank.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:

- Driver in Driver's station of disabled tank.
- Driver's hatch on disabled tank closed.
- Disabled tank towed by tow tank.
- If necessary, disabled tank braked by brake tank.

REFERENCES

TM 9-2350-255-10; p. 2-281.

TASK 7S: DISCONNECT TOW CABLES

CONDITIONS/STIMULUS

System State: Table S, Column 7S
Driver Location: Outside Tank
Initiating Stimuli: Completion of Task 6S

ACTION

Driver will:

NOTE A: Four crewmembers are needed to disconnect tow cables.

1. Put wood blocks under each end of both tracks on disabled tank.
2. Make sure there is slack in all cables connecting tanks. If not, do the following:
   a. Start engines (see Task 1C) of tow tank and, if necessary, brake tank.
   b. Move tow tank and, if necessary, brake tank toward disabled tank and leave slack in cables. Press on parking brake pedal (s) (located near Driver's right foot) to set parking brake, then let go.
   c. Shut down engine (s) (see Task 1L).
3. Turn cable ends of all cables 1/4 turn and take off cable ends from connecting hooks on front and rear of tanks.
4. Take off all locking pins from ends of pins holding connecting hooks.
5. Take off all pins and connecting hooks from tow eyes on front and rear of tanks.
6. Put two hooks, two pins and four locking pins in left stowage box on each tank.
7. Put one end of each tow cable over front hook on side of each turret and turn hook 1/4 turn to rear of turret.
8. Grasp other end of each cable and pull over retainers on turret. Put each cable end in retainers.
9. Hook each cable middle in clips on side of each turret.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 9.

Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 9.

Accuracy - As indicated by:

- Tow cables in hooks, retainers, and clips on sides of turrets.
- Two connecting hooks, two pins and four locking pins in left sponson box on each tank.

REFERENCES

TM 9-2350-255-10; p. 2-283 to 2-284.

TASK 1T: RETRIEVE MIRED TANK

CONDITIONS/STIMULUS

System State: Table T, Column 1T
Driver Location: Outside Tank
Initiating Stimuli: Mired Tank

ACTION

Driver will:

NOTE A: XM1 tank is used as tow tank and mired tank in this procedure.

1. Enter driver's station of mired tank (see Task 1A).
2. Press on parking brake pedal (located near Driver's right foot) then let go.
3. Check that transmission control (located on Steer-Throttle control) is set to N. If not, do the following:
   a. Make sure VEHICLE MASTER POWER switch (located on Driver's Master panel) is set to ON.
   b. Set transmission control to N.
   c. Have loader traverse turret so main gun is over rear of tank.
   d. Push down and hold VEHICLE MASTER POWER switch to OFF, then let go.

NOTE B: Do not use wood blocks when connecting cables.

4. Connect tow cables to mired tank and to tow tank (see Task 5S).

NOTE C: Do not stand near cables when starting to retrieve mired tank. Cables can snap and injure you.

5. If engine and transmission of mired tank are okay, start mired tank engine (see Task 1C); if not, go to step 11.
6. Check that driver's hatch on both vehicles are closed. If not, close hatches (see Task 2M).
7. Start tow tank engine (see Task 1C).
8. Have T.C. set up radio contact between mired tank and tow tank and maintain contact when retrieving mired tank.
9. Pull on mired tank parking brake release handle (located near Driver's right hand).
10. If engine of mired tank is not running, do the following:
    a. If tank is to be towed forward, set transmission control to L. If tank is to be towed backward, set transmission control to R.

NOTE D: Take care not to hit tow tank with mired tank when mired tank starts to move on its own power.

b. Turn throttle hand grips back on mired tank as tow tank starts to move.
c. Slowly drive tow tank to pull mired tank free (see Task 6S).
d. Press service brake pedals (located at Driver's feet) in mired tank and in tow tank to stop both tanks at the same time after mired tank is free.
e. Go to Step 12.

NOTE E: If engine of mired tank is not running, tank can be stopped by using parking brake pedal.

11. If engine of mired tank is not running, slowly drive tow tank to pull mired tank free (see Task 6S) and stop when mired tank is free.
12. Press on parking brake pedal in mired tank and in tow tank, then let go.
13. Disconnect tow cables from mired tank and tow tank (see Task 7S).

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As indicated by:

. Mired tank free
. Parking brakes engaged on tow and mired tank.
. Completion of Task 7S.

REFERENCES

TM 9-2350-255-10; p. 2-285 to p. 2-286.

TASK 1U: OPERATE TANK ON SNOW OR ICE

CONDITIONS/STIMULUS

System State: Table U, Column 1U
Driver Location: In Driver's Station
Initiating Stimuli: Terrain of Ice and Snow and Completion of Module E.

ACTION

Driver will:

1. Turn throttle handgrips (located on Steer-Throttle control) slowly to change speed.
2. Keep throttle handgrips steady after tank reaches desired speed.
3. Turn tank slowly when on slippery surfaces.
4. Steer tank away from ruts and large snow banks.
5. Steer tank straight up and down hills if possible.
6. If tank starts to slide or skid, do the following:
   a. Turn throttle handgrips forward to idle position.
   b. Steer tank in direction of slide until tank stops.
   c. Twist throttle handgrips back slowly and steer tank on a straight course.
7. If more traction is needed, turn throttle handgrips forward so that tank slows down to 15 km/h (9 mph) or less and set transmission control (located on Steer-Throttle control) to L.
8. If tank breaks through heavy crusted snow do the following:
   a. Turn throttle handgrips forward to idle position.
   b. Set transmission control to L after tank slows to 15 km/h (9 mph) or less.
   c. Turn throttle handgrips back slowly so that tank moves at slowest speed possible without stopping and try to climb onto crust.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of appropriated Step.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of appropriate Step.
Accuracy - As indicated by:
. Tank operating properly on snow and ice.

REFERENCES

TM 9-2350-255-10; p. 2-287.

TASK IV: COMPLETE SILENT WATCH DUTY CYCLE

CONDITIONS/STIMULUS

System State: Table V, Column 1V
Driver Location: In Driver's Station
Initiating Stimuli: Order From TC to Begin Silent Watch Duty Cycle

ACTION

Driver Will:

NOTE A: Tank must be operated for 20 minutes with all stationed powered up before silent watch duty cycle can be used.

NOTE B: Silent watch duty cycle must not last over one hour.

1. Shut down engine (see Task 1L).
2. Operate PERSONNEL HEATER in cold weather (see Module J).
3. If LOW BAT CHG light (located on Driver's instrument panel) comes on, start engine as directed by TC (see Task 1C).
4. If voltmeter (located on Driver's instrument panel) reading approaches 18 volts, tell TC.
5. At end of silent watch duty, start engine (see Task 1C) on command from TC and continue mission.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:
- Personnel heater operating in cold weather.
- Engine starting after end of silent watch cycle.

REFERENCES

TM 9-2350-255-10; p. 2-319.

TASK 1W: COMPLETE SHORT TRACKING

CONDITIONS/STIMULUS:

System State: Table W, Column 1W
Driver Location: In Driver's Station
Initiating Stimuli: Damage to Roadwheel No. 1 or Nos. 1 and 2 (Both Wheels Removed)

ACTION

Driver will:

NOTE A: This procedure can be used for short tracking either right or left side.

NOTE B: Track is to be disconnected (see Task 2X, if necessary).

1. Shut down engine (see Task 1L).
2. Open No. 2 Skirt panel (see Task 1O).

NOTE C: If No. 2 torsion bar (located in center of roadarm) is broken, go to Step 5.

3. Unscrew two plugs (located at center of roadarm) from No. 2 roadarm (one from roadarm end and one from anchor end on opposite side) using hammer and chisel, tapping plug counter-clockwise.
4. Loosen No. 2 roadarm from torsion bar splines by driving torsion bar (located in center of roadarm) into roadarm with a 2-pound ballpeen hammer and sledge hammer.

NOTE D: There are two short screw holes in No. 2 roadarm assembly retainer. The threads in these two holes are nylon covered for identification and are to be used with jack Screws in Step 7.

5. Unscrew and take out 14 screws from No. 2 roadarm assembly retainer (located around torsion bar) using a 15/16 inch (24mm) socket, extension and handle.
6. Swing No. 2 roadarm out of the way as needed for access to screws. Two of the 14 screws will be long screws and are to be used as jack screws.
7. Screw two jack screws (long screws in Step 6) into nylon covered threaded jack screw holes with adjustable wrench. Tighten jack screws evenly until round retainer separates from rectangular housing bolted to tank.
8. Place pry bar between round retainer and rectangular housing. Pry out retainer with quick jerking motion.

NOTE E: Complete torsion bar weighs 123 pounds. Three crewmembers are needed in Step 9 to prevent injury.

9. Take out roadarm, torsion bar, and shock absorber (located behind roadarm).
10. Unscrew and take out four screws holding No. 2 bumper stop (located behind No. 2 roadwheel) with adjustable wrench.
11. Take off No. 2 bumper stop.
12. Have hole dug under No. 3 roadwheel.
13. Start engine (See Task 1C).
14. Drive tank slowly over hole so that No. 3 roadarm (attached to No. 3 roadwheel) is hanging straight down in hole.
15. Back tank slowly away from hole. Check that No. 3 roadarm and roadwheel reverse direction (swing forward) as tank is backed away from hole.
16. Keep backing tank slowly until upper end of track (located on top of roadwheels) is behind NO. 1 support roller (located above and in front of No. 3 roadwheel) and resting on No. 3 roadwheel.
17. Slowly drive tank forward again until at least four track shoes are hanging over No. 3 roadwheel.
18. Take out damaged and unneeded links from both ends of broken track (see Task 90, Step 3).
19. Connect track (see Task 3X).

NOTE F: Short tracking provides limited mobility and driving visibility. XM1 will pull toward short tracked side during steering and braking. Avoid hard braking and sharp turns when possible. DO NOT drive faster than 16k/pm (10 mph) when short tracked. Tank must be driven in reverse to keep No. 3 roadwheel in short tracking position).

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 19.

Accuracy - As indicated by:

- Track connected at proper length by passing No. 1 and No. 2 roadwheels.
- No. 2 roadarm, torsion bar and shock absorber removed.

REFERENCES

TM 9-2350-255-10; p. 2-315 - 2-318.

TASK 1X: RELEASE TRACK TENSION

CONDITIONS/STIMULUS:

System State: Table X, Column 1X
Driver Location: In Driver's Station
Initiating Stimuli: Need For Track Maintenance

ACTION

Driver will:

1. Make sure engine is shut down (see Task 1L).
2. Pull parking brake release handle (located at Driver's right hand), then let it go.
3. Check that PARKING/SERVICE BRAKE light is OFF. If not, tell TC.
4. Set and hold VEHICLE MASTER POWER Switch (located on Driver's master panel) to OFF.
5. When VEHICLE MASTER POWER light (located above VEHICLE MASTER POWER switch) goes OFF, let go of switch. If light does not go OFF, tell TC.
6. Open No. 1 skirt panel (see Task 1O).
7. Clean threads on adjusting link (located on No. 1 roadwheel) with wire brush.
8. Clean relief valve (located on top of adjusting link) with wiping rag.
9. Unscrew lock screw (located on adjusting link) about 3 1/2 turns, using 24 millimeter socket and handle.
10. Connect grease gun and adapter to fitting (located to side of adjusting link relief valve).

    NOTE A: If fitting will not take grease, if relief valve works too easily, or if adjusting link does not move, tell TC.

    NOTE B: If locknut (located on adjusting link threads) will not release by doing Step 11, have other crewmember put small object on top of valve pin (located on top of adjusting link) and use it as lever to press down valve pin while you pump grease into fitting. If locknut still will not release, use cheater bar on spanner wrench to turn locknut.

11. Have another crewmember hold down valve pin while you pump grease into fitting.

    NOTE C: Locknut is released when barrel of adjusting link has moved away from locknut.

12. When locknut is released, stop pumping grease into fitting.

13. Disconnect adapter from fitting as follows:
    a. Lift adapter until it touches slot in bracket covering fitting.
    b. Twist and pull adapter to remove it from fitting.
14. Unscrew locknut to end of threads near bracket covering fitting.
15. Lift up and hold valve pin using screwdriver, so grease flows out1
16. Catch grease, using wiping rag.
17. Let valve pin go when grease stops flowing out.
18. Wipe up grease, using wiping rag.

MEASUREMENT

During Traning:
Time - Between end of initiating stimulus and completion of Step 1B.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 18.
Accuracy - As indicated by:
. Adjusting link locknut unscrewed.
. Adjusting link bled of grease,
or . TC notified.

REFERENCES

TM 9-2350-255-10; pp. 3-114 to 3-115.

TASK 2X: DISCONNECT TRACK

CONDITIONS/STIMULUS

System State: Table X, Column 2X
Driver Location: Outside Tank
Initiating Stimuli: Need of Track Maintenance

ACTION

Driver will:

NOTE A: Tank should be parked on level ground.

1. Open No. 1 skirt panel (located above No. 1 roadwheel) (see Task 10).
2. Release track tension (see Task 1X).
3. Remove centerguide (located at center of track) between idler wheel and No. 1 roadwheel.
4. Remove end connectors on both sides of removed centerguide at top of track link using two track connecting fixtures (see Task 90).
5. Have on crewmember support track forward from No. 1 roadwheel using crow bar.
6. Loosen jaws a little on inner track connecting fixture (where end connector was removed) using 30 millimeter socket and handle.
7. Loosen jaws a little on outer track connecting fixture (where end connector was removed) using 30 millimeter socket and handle.
8. Repeat steps 6 and 7 until jaws on track connecting fixtures are loose.
9. Remove track connecting fixtures from inner and outer sides of track.
10. Tell other crewmember to lower track slowly to ground, using crowbar.
11. Remove crowbar.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 11.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 11.
Accuracy - As indicated by:
. Track disconnected

REFERENCES

TM 9-2350-255-10; p. 3-127

TASK 3X: CONNECT TRACK

CONDITIONS/STIMULUS

System State: Table X, Column 3X
Driver Location: Outside Tank
Initaiting Stimuli: Completion of Track Maintenance

ACTION

Driver will:

1. Turn screws on ends of two track connecting fixtures until jaws of fixtures are open all the way, using 30 millimeter socket and handle.
2. Have another crewmember lift lower end of track (located between the idler wheel and No. 1 roadwheel) to meet upper end of track, using crowbar.
3. Put jaws of one track connecting fixture on link pins on lower and upper ends of track.
4. Turn screw (located on end of connecting fixture) until jaws of connecting fixture are snug on link pins, using 30 millimeter socket and handle.
5. Put jaws of other track connecting fixture on link pins on other side of track.
6. Turn screw (located on end of connecting fixture) until jaws of track connecting fixture are snug around link pins, using 30-millimeter socket and handle.
7. Tighten jaws of one connecting fixture a little, using 30 millimeter socket and handle.
8. Tighten jaws of second connecting fixture a little, using 30 millimeter socket and handle.
9. Repeat steps 7 and 8 until link pins (located on both sides of track) are close enough for end connectors to fit.

   NOTE A: Tighten and have organizational maintenance torque the two replaced end connectors along with two end connectors directly below replaced end connectors.

10. Install end connectors on link pins on both sides of track (see Task 90).
11. Have other crewmembers remove crowbar from under track.

    NOTE B: Tighten replaced centerguide along with centerguide directly below replaced centerguide.

12. Install centerguide between replaced end connectors (see Task 90).

13. Adjust track tension (see Task 4X).
14. Close No. 1 track skirt covering No. 1 roadwheel as follows:
    a. Lift and swing No. 1 skirt against strut (located on the tank pointing toward skirt) with crowbar.
    b. Tap dowel through fasteners (located on skirt and tank body) with hammer.
    c. Put spring pin through end of dowel with pliers and swing locking loop down.
    d. Slide swing hook into position.
    e. Tighten bolt (located through swinghook) with 30 millimeter socket and handle.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 14.
Accuracy - As measured by the match between the steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 14.
Accuracy - As indicated by:
- Track connected
- End connectors installed
- Centerguides installed
- Track tension adjusted
- No. 1 track skirt closed.

REFERENCES

TM 9-2350-255-10; -. 3-109, p.3-129 to p. 3-130.

TASK 4X: ADJUST TRACK TENSION

CONDITIONS/STIMULUS

System State: Table X, Column 4X
Driver Location: Outside Tank
Initiating Stimuli: Track Tension Maladjustment

ACTION

Driver will:

NOTE A: Tank should be parked on level ground for accurate track tension adjustment.

1. Make sure No. 1 track skirt (covering No. 1 roadwheel) is open (see Task 10).
2. Make sure track tension is released (see Task 1X).
3. Check threads on adjusting link (located on No. 1 raodwheel). If dirty, clean using wire brush.
4. Check relief valve (located on top of adjusting link). If durty, clean using rag.
5. Check that lockscrew (located on top of adjusting link) is loose. If not, loosen screw about 3 1/2 turns, using 24 millimeter socket and handle.
6. Connect grease gun and flexible adapter to fitting (located to side of adjusting link relief valve).

NOTE B: If grease comes out of valve at bottom of adjusting link during adjustment, adjusting link is extended too far. Disconnect track, remove one track link, connect track, and adjust track tension again. If track link must be removed when adjusting one track, other track may not have to be shortened unless adjusting link on that side is extended too far also.

NOTE C: If fitting (located to side of adjusting relief valve) will not take grease or leads grease, do steps 7 through 9. otherwise, go to Step 10.

7. Unscrew and remove bad fitting from side adjusting link, using lubrication fitting tool.
8. Get rid of bad fitting.
9. Screw new fitting into adjusting link until tight, using lubrication fitting tool.

NOTE D: If relief valve works too easily, or if adjusting link will not move, tell TC.

10. Pump grease into fitting until grease flows out of relief valve.

11. Disconnect adapter from fitting as follows:
    a. Lift adapter until it touches slot in bracket covering fitting.
    b. Twist and pull adapter to remove it from fitting.
12. Screw locknut along threads until loosely seated against tube (on which lockscrew is located) using spanner wrench.
13. Repeat steps 1 through 12 for otherside of tank, if necessary.
14. Start engine (see Task 1C).
15. Driver rearward about 20 feet (see Module E).
16. Drive forward about 20 feet, then set transmission control (located on Steer-Throttle control) to N and coast to a stop.
17. Shut down engine (see Task 1L).
18. Stay in tank and be ready to push parking brake pedal (located at Driver's right foot) if outside crewmember says to stop tank.

NOTE E: If tank starts to move while steps 19 through 27 are being done, crewmember outside tank should tell driver to stop tank.

NOTE F: Crewmember outside tank does steps 19 through 27.

19. Connect grease gun and adapter to fitting (located to side of adjusting link relief valve).
20. Pump grease into fitting until grease flows out of relief valve (located on top of adjusting link).
21. Disconnect adapter from fitting as follows:
    a. Lift adapter until it touches slot in bracket covering fitting.
    b. Twist and pull adapter o removeit from fitting.
22. Screw locknut until its nearest slot is in line with lock screw, using spanner wrench.
23. Unscrew locknut until its nearest slot is in line with lock screw, using spanner wrench.
24. Tighten lockscrew, using 24 millimeter socket and handle.
25. Clean grease from relief valve and fitting, using rag.
26. Repeat steps 18 through 25 for other side of tank, if necessary.
27. Repeat steps 18 through 25 for track which are being adjusted.
28. Close No. 1 track skirt (see Task 3X).

29. If necessary, close Nos. 2 and 3 or 4 and 5 skirts as follows:
    a. Swing Nos. 2 and 4 or 4 and 5 skirts closed.
    b. Tap dowel through fasteners (located at top of skirts) with hammer.
    c. Put spring pin through end of dowel with pliers, and swing locking loop down and over end of dowel.
30. If necessary, close side mudguards as follows:
    a. Swing side mudguard closed.
    b. Put pin in hinge to lock mudguard closed.
    c. Replace retaining pin into hole of hinge pin.

MEASUREMENT

During Training:
Time - Between end of initiating stimuli and completion of Step 2B.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 2B.
Accuracy - As indicated by:
- Locknut seated against adjusting link tube, after tank has been moved forward and backward.
- Locknut secured with lock screw tightened.
- No. 1 track skirt closed.
- Nos. 2 and 3 and 4 and 5 skirts closed.
- Side mudguards closed.

or
- TC notified.

REFERENCES

TM 9-2350-255-10; pp. 3-116 to 3-119

TASK 5X: OPEN FRONT FENDER

CONDITIONS/STIMULUS

System State: Table X, Column 5X
Driver Location: In Driver's Station
Initiating Stimuli: Need of Track Maintenance

ACTION

Driver will:

1. Make sure engine is shut down (see Task 1L).
2. Lift front fender (located above idler wheel) to unlock it.
3. Fold front fender back.
4. Tie one end of rope around fender.
5. Tie other end of rope (located on left front deck) to hand hold for left front fender or skirt pin bracket (located on right front deck) for night front fender.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 5.
Accuracy - As indicated by:
. Front fender folded back, tied to hand hold or skirt pin bracket.

REFERENCES

TM 9-2350-255-10; p. 3-113

TASK 6X: CLOSE FRONT FENDER

CONDITIONS/STIMULUS

System State: Table X, Column 6X
Driver Location: Outside Tank
Initiating Stimuli: Completion of Track Maintenance

ACTION

Driver will:

1. Untie rope from fender and from hand hold (located on left front deck) for left front fender, or skirt pin bracket (located on right front deck) for right front fender.
2. Lift fender up, push forward, and lower into position.
3. Make sure front fender locks in place.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 3.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 3.
Accuracy - As indicated by:
. Front fender closed, locked into place.

REFERENCES

TM 9-2350-255-10; p. 3-113.

TASK 7X: REPLACE FRONT BLACKOUT MARKER LAMP

CONDITIONS/STIMULUS

System State: Table X, Column 7X
Driver Location: In Driver's Station
Initiating Stimuli: Burned Out Blackout Marker Lamp

ACTION

Driver will:

1. Power down hull systems (see Task 1M).
2. Unscrew and take out four screws, split washers, and flat washers holding head lamp lens holder to headlamp body and set aside for later use.
3. Take off headlamp lens holder. Set aside for later use.
4. Unscrew and take out hidden screw (hidden by head lamp lens holder) and remaining headlamp cover screw, split washer and flat washer from head lamp cover. Set aside for later use.
5. Take off headlamp cover. Set aside for later use.
6. Grasp blackout lamp (located to side of headlight) and push lamp into socket while turning lamp counterclockwise. Pull lamp out of socket.
7. Take lamp to spare lamp box and get identical replacement.
8. Get rid of bad lamp.
9. Push new lamp into socket while turning.
10. Check operation of blackout marker (see Task 1K).
11. If marker does not work, tell TC.

NOTE A: Make sure split washer is closest to screw head of head lamp cover screw closest to blackout lamp, and flatwasher is between split washer and head lamp cover.

12. Attach headlamp cover by replacing headlamp cover screw closest to blackout lamp, split washer, and flat washer and hidden screw.
13. Attach lens holder using four screws, split washers, and flat washers.

MEASUREMENT

During Training:
- Time - Between end of initiating timulus and completion of Step 13
- Accuracy - As measured by the match between steps given above nd steps performed by the Driver.

End of Training:
- Time - Between end of initiating stimulus and completion of Step 13.
- Accuracy - As indicated by:
  - . Blackout markers working
  - . Headlamp cover screwed in place
  - . Headlamp lens holder screwed in place
  - or . TC notified.

REFERENCES

TM 9-2350-255-10; p. 3-80.

TASK 8X: REPLACE HEADLIGHT LAMP

CONDITIONS/STIMULUS

System State: Table X, Column 8X
Driver Location: In Driver's Station
Initiating Stimuli: Burned Out Headlight Lamp

ACTION

Driver will:

1. Power down hull systems (see Task 1M).
2. Remove headlamp lens holder and cover (see Task 7X and set aside for later use.
3. Roll front edge of rubber mount surrounding headlamp toward back of headlamp.
4. Carefully pull headlamp from mount.
5. Hold headlamp secure and pull out plug (located at center of back of headlamp).
6. Get new headlamp from organizational maintenance.
7. Hold new headlamp securely and aline connected slots on plug with lamp terminals. Push plug onto back of headlamp until it is properly connected.
8. Place one edge of headlamp inside of rubber mount. Roll edge of mount over edge of lamp until the lamp is entirely inside mount.
9. Make sure headlamp is sitting properly inside mount.
10. Test replaced headlamp (see Task 1L).
11. If lamp does not light, tell TC.
12. Set VEHICLE MASTER POWER switch to OFF.
13. Install headlamp lens holder and cover (see Task 7X, Steps 11 and 12.)

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 13.
Accuracy - As indicated by:
- Headlight lamps working
- Headlamp cover screwed in place
- Headlamp lens holder screwed in place

or
- TC notified.

REFERENCES

TM 9-2350-255-10; p. 3-81.

TASK 9X: REPLACE TAILLIGHT LAMP

CONDITIONS/STIMULUS

System State: Table X, Column 9X
Driver Location: In Driver's Station
Initiating Stimuli: Burned Out Taillight Lamp

ACTION

Driver will:

NOTE A: There are four lamps in each taillight. The lamps are as follows from top to bottom: service tail, service stop, blackout marker, and blackout stop.

1. Power down hull systems (see Task 1M).
2. At rear of tank, loosen six captive screws holding door to taillight.
3. Removed burned out lamp by pressing in while twisting lamp counterclockwise.
4. Install new lamp by pressing lamp in socket while twisting lamp clockwise.
5. Make sure gasket is seated in door, between door and taillight.
6. Secure door to taillight by tightening six screws.
7. Check operation of taillight lamp (see Task 1L).
8. If lamp does not light, tell TC.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 7 (or 8).
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 7 (or 8).
Accuracy - As indicated by:
. Taillight lamps working
. Taillight door screwed to taillight with gasket in place
or . TC notified.

REFERENCES

TM 9-2350-255-10; p. 3-82.

TASK 10X: REFUEL TANK

CONDITIONS/STIMULUS

System State: Table X, Column 10X
Driver Location: Outside Tank
Initiating Stimuli: Fuel Tank in Need of Fuel

ACTION

Driver will:

NOTE A: Do not refuel unless another crew member is ready to use portable fire extinguisher.

NOTE B: Each front tank must be filled through its own filler cap. Have loader position turret to refill either left or right front tank. Rear tank must be filled through either one or both rear filler caps.

1. Clean area around cover of fuel tank.
2. Open cover of selected filler cap. Pull out pin holding cover; lift cover.
3. Wipe filler cap and neck clean. If refueling front tanks, clean recess under cover and make sure drain is clear. Use bore cleaning compound (RBC), if necessary, to loosen dirt.
4. Turn cap counterclockwise and take cap from filler neck.
5. Have crewmember stand at fuel filler cap, pointing fire extinguisher nozzle towards fillerneck. Have crewmember help with fuel hose, if needed.
6. Put fuel pump nozzle in filler neck. Pump fuel into tank.
7. Look into filler neck. Stop fuel flow when fuel is 6 i ches below top of fillerneck. Take fuel pump nozzle out of filler neck.
8. Have crewmember put on fuel cap and turn it to right to close. Have crewmember close cover and lock with pin.
9. Set TANK SELECTOR switch (located on Driver's instrument panel) to REAR after refueling.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 9.

Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 9.

Accuracy - As indicated by:

- Fuel level in tank(s) 6 inches below top of filler neck.
- Fuel cap closed.
- Fuel cap cover closed and locked with pin.
- TANK SELECTOR switch set to REAR.

REFERENCES

TM 9-2350-255-10; pp. 3-99 to 3-100.

TASK 1Z: INSTALL WATER FORDING KIT ITEMS

CONDITIONS/STIMULUS

System State: Table Z, Column 1Z
Driver Location: In Driver's Station
Initiating Stimuli: Need to ford water obstacle over four feet deep but not as deep as turret roof level

ACTION

Driver will:

NOTE A: All crewmembers work at the same time and have assigned steps.

NOTE B: Tank should be stopped on level ground

1. Exit tank as soon as VEHICLE MASTER POWER switch is set to OFF.
2. Unscrew and take off two front vented fuel tank caps (located on front tank deck).
3. Screw two unvented fuel tank caps into front fuel tanks.

NOTE C: If rear grill doors are hot, wear asbestos gloves before grasping them.

4. Open right rear grille door (located on rear deck) as follows:
   a. Loosen screw securing the grille hook using a 30 millimeter socket and handle.
   b. Turn grille hook up and to side of tank.
   c. Grasp right door and pull back and to outside.
5. Open left rear grille door (located on rear of deck) (See Step 4, a through c).

NOTE D: Commander helps with steps 6,7 and 8.

6. Place exhaust tower adapter on engine exhaust duct hidden behind grille door.
7. Screw in and hand tighten four thumb screws on exhaust tower adapter. Tighten screws another 1/4 turn using pliers.
8. Put exhaust tower on exhaust tower adapter.
9. Turn exhaust tower quick-release clamp handle (located on end of tower) to face right side of tank and push in.
10. Place strut on right rear grille door and engine exhaust duct.
11. Screw in and tighten two bolts to strut using 5/8 inch socket and handle.
12. Stow tools and two vented fuel caps in cargo rack box.

13. Enter Driver's station.
14. Spread drain valve handles (located near Driver's right hand) and push down to close.

NOTE E: Be sure turret is not traversed when turret seal is inflated.

15. Close turret seal valve (located above and to the left of Driver) and pump handle of turret seal pump (located below turret seal valve) until turret seal pressure gage (located next to turret seal valve) reads and holds 12 to 14 psi.

MEASUREMENT

During Training:
Time - Between end of initiating stimulus and completion of Step 15.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:
Time - Between end of initiating stimulus and completion of Step 15.
Accuracy - As indicated by:

- Two unvented fuel tank caps in front fuel tanks.
- Exhaust tower in place with quick release handle facing right side of tank, pushed in.
- Strut in place and tight on right rear grille door and engine exhaust duct.
- Drain valve handles closed.
- Turret seal pressure reading 12 to 14 psi.

REFERENCES

TM 9-2350-255-10; p. 2-290, p. 2-295 to p. 2-296.

TASK 2Z: DRIVE INTO WATER OBSTACLE

CONDITIONS/STIMULUS

System State: Table Z, Column 2Z
Driver Location: In Driver's Station
Initiating Stimuli: Completion of Task 1Z

ACTION

Driver will:

1. Start engine (see Task 1C).
2. Close driver's hatch (see Task 2M).
3. Check with TC that engine fuel and oil supplies are okay for fording operation. If not, add supplies.
4. Make sure engine is warmed up. If not, run engine for 15 minutes.
5. Check with TC that communications are operating.
6. Set BILGE PUMP switch (located on Driver's master panel) to ON.
7. Pull parking brake release handle (located near Driver's right hand) to release parking brake.
8. Set TACTICAL IDLE switch (located on Driver's master panel) to ON.

   NOTE A: Air cleaner clogged light will come on as water level reaches top of rear deck. Light should go out as water drains from engine compartment.

9. Drive tank slowly into water (see Module E), taking Take care not to make a bow wave.
10. If tank must be stopped when fording water, do the following:
    a. Press on service brake pedal (located between Driver's feet) and hold after tank stops.
    b. Release service brake pedal to start tank moving.
    c. Drive tank at 5 to 6 km/h (3 to 4 mph) or less through water.

MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 9 (or 10).

Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 9 (or 10).

Accuracy - As indicated by:

- Tank in water with engine running.
- TACTICAL IDLE switch set to ON.
- BILGE PUMP switch set to ON.
- Parking brake released.
- Driver's hatch closed.
- Oil and fuel supplies okay.
- Communications working.

REFERENCES

TM 9-2350-255-10; p. 2-298.

TASK 3Z: DRIVE OUT OF WATER OBSTACLES

CONDITIONS/STIMULUS

System State: Table Z, Column 3Z
Driver Location: In Driver's Station
Initiating Stimuli: Completion of Task 2Z

ACTION

Driver will:

1. Set BILGE PUMP switch (located on Driver's master panel) to OFF when pump stops.

   NOTE A: When in immediate combat after driving out of water, open turret seal valve (located above and to the left of Driver) and deflate turret seal.

2. If not in immediate combat after leaving water, stop tank (see Task 3E).
3. Shut down engine (see Task 1L).
4. Open left and right No. 1 skirt (see Task 1O).
5. Check idler wheel hub (located behind No. 1 skirts) and roadwheel hubs for water in oil (milky look). If water is in oil, tell TC.
6. Close left and right No. 1 skirt (see Task 3X).

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 6.
Accuracy - As indicated by:

- BILGE PUMP set to OFF.
- Idler wheel hub and roadwheel hubs checked for water in oil.
- No. 1 skirts closed.
- If in combat, turret seal deflated.

REFERENCES

TM 9-2350-255-10; p. 2-299.

TASK 4Z: PREPARE TANK FOR OPERATION AFTER FORDING

CONDITIONS/STIMULUS

System State: Table Z, Column 4Z.
Driver Location: In Driver's Station
Initiating Stimuli: Completion of Task 3Z

ACTION

Driver will:

NOTE A: All crewmembers work at the same time and have assigned steps.

1. Open turret seal valve (located above and to the left of Driver) and deflate turret seal.
2. Exit station and get two vented fuel caps from cargo rack box after VEHICLE MASTER POWER switch is set to OFF.
3. Take out two bolts from strut (located on right rear grille door and engine exhaust duct) using 5/8 inch socket and handle.
4. Take off strut from rear grille door and engine exhaust duct.
5. Pull on exhaust tower quick release clamp (located at tower bottom) and take off exhaust tower from exhaust tower adapter on engine exhaust duct.
6. Take off exhaust tower adapter from engine exhaust duct (located behind right rear grille door).

NOTE B: If rear grille doors are hot, wear asbestos gloves before grasping them.

7. Close left rear grille door (located on rear of deck) as follows:
   a. Grasp left door and push forward until screw in front tank body is through hole in left door.
   b. Turn grille hook down and over screw in left door.
   c. Tighten screw using 30 millimeter socket and handle.
8. Close right rear grille door (located on rear of deck) (see Step 7, a through c).
9. Unscrew and take off two front unvented fuel tank caps (located on front deck).
10. Screw two vented fuel tank caps into front fuel tanks.

MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 10.

Accuracy - As measured by the match between steps given above and steps performed by the Driver.

End of Training:

Time - Between end of initiating stimulus and completion of Step 10.

Accuracy - As indicated by:

- Turret seal deflated.
- VEHICLE MASTER POWER switch set to OFF.
- Rear grille doors closed and secured.
- Two vented caps screwed in front fuel tanks.

REFERENCES

TM 9-2350-255-10; p. 2-300 to p.2-301.

TABLES

TABLE A

POSITION OF CONTROLS FOR TASKS IN MODULE A
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS				
	1A	2A	3A	4A	5A
Turret Power switch	OFF	OFF	OFF	OFF	OFF
VEHICLE MASTER POWER switch	OFF	OFF	OFF	OFF	ON
TRANSMISSION SHIFT control	N	N	N	N	N
Parking Brake	ENGAGED	ENGAGED	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch handles	CLOSED	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED
Intercommunication Monitor switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	INT ONLY
Dome light	OFF	ON	ON	ON	ON
LIGHT switch	OFF	OFF	OFF	OFF	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	OFF	OFF	OFF
Air Heater Control	OFF	OFF	OFF	OFF	OFF
NIGHT PERISCOPE	OFF	OFF	OFF	OFF	OFF
BILGE Pump	OFF	OFF	OFF	OFF	OFF
SMOKE GENERATOR	OFF	OFF	OFF	OFF	OFF

TABLE B

POSITIONS OF CONTROLS FOR TASKS IN MODULE B WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS		
	1B	2B	3B
TURRET POWER switch	OFF	OFF	OFF
VEHICLE MASTER POWER switch	OFF	ON	ON
TRANSMISSION SHIFT control	N	N	N
Parking Brake	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED
Intercommunication Monitor switch	INT ONLY	INT ONLY	INT ONLY
Dome Light	ON	ON	ON
LIGHT switch	OFF	OFF	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	OFF
Air Heater Control	OFF	OFF	OFF
NIGHT PERISCOPE	OFF	OFF	OFF
BILGE PUMP	OFF	OFF	OFF
SMOKE GENERATOR	OFF	OFF	OFF

TABLE C

POSITION OF CONTROLS FOR TASKS IN MODULE C WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS	
	1C	2C
TURRET POWER switch	OFF	OFF
VEHICLE MASTER POWER switch	ON	ON
TRANSMISSION SHIFT control	N	N
Parking Brake	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN	OPEN
Intercommunication Monitor switch	INT ONLY	INT ONLY
Dome light	ON	ON
LIGHT switch	OFF	OFF
Drain Valve handles	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF
Air Heater Control	OFF	OFF
NIGHT PERISCOPE	OFF	OFF
BILGE PUMP	OFF	OFF
SMOKE GENERATOR	OFF	OFF

TABLE D

POSITION OF CONTROLS FOR TASKS IN MODULE D WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1D	2D	3D	4D
TURRET Power switch	OFF OR ON	OFF OR ON	OFF OR ON	OFF OR ON
VEHICLE MASTER Power switch	ON	ON	ON	ON
TRANSMISSION SHIFT Control	N	N	N	N
Parking Brake	ENGAGED	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN	OPEN	OPEN	OPEN
Intercommunication Monitor Switch	INT ONLY	INT ONLY	INT ONLY	INT ONLY
Dome light	ON	ON	ON	ON
LIGHT switch	OFF	OFF	OFF	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	OFF	OFF
Air Heater control	OFF	OFF	OFF	OFF
NIGHT PERISCOPE	OFF	OFF	OFF	OFF
BILGE Pump	OFF	OFF	OFF	OFF
SMOKE GENERATOR	OFF	OFF	OFF	OFF
TACTICAL IDLE switch	OFF	OFF	OFF	OFF

TABLE E

POSITION OF CONTROLS FOR TASKS IN MODULE E WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS		
	1E	2E	3E
TURRET POWER switch	ON OR OFF	ON OR OFF	ON OR OFF
VEHICLE MASTER POWER switch	ON	ON	ON
TRANSMISSION SHIFT control	N	D,L,R OR PVT	D,L,R OR PVT
Parking Brake	ENGAGED	RELEASED	RELEASED
Driver's Hatch handles	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED
Intercommunication Monitor switch	INT ONLY	INT ONLY	INT ONLY
Dome light	ON	ON	ON
LIGHT switch	OFF	STOP LIGHT ONLY	STOP LIGHT ONLY
Drain Valve handles	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	OFF
Air Heater control	OFF	OFF	OFF
NIGHT PERISCOPE	OFF	OFF	OFF
BILGE Pump	OFF	OFF	OFF
SMOKE GENERATOR	OFF	OFF	OFF

TABLE F

POSITION OF CONTROLS FOR TASKS IN MODULE F
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS			
	1F	2F	3F	4F
TURRET POWER system	ON or OFF	ON or OFF	ON or OFF	ON or OFF
VEHICLE MASTER POWER switch	ON	ON	ON	ON
TRANSMISSION SHIFT control	N, D, L, R, PVT	N, D, L, R, PVT	N, D, L, R, PVT	N, D, L, R, PVT
Parking Brake	ENGAGED or RELEASED	ENGAGED or RELEASED	ENGAGED or RELEASED	ENGAGED or RELEASED
Driver's hatch handles	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED
Intercommunication Monitor switch	INT ONLY	INT ONLY	INT ONLY	INT ONLY
Domelight	ON	ON	ON	ON
LIGHT switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
AIR HEATER control	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
NIGHT PERISCOPE	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
BILGE PUMP	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
SMOKE GENERATOR	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION

TABLE G

POSITION OF CONTROLS FOR TASKS IN MODULE G
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS				
	1G	2G	3G	4G	5G
TURRET POWER switch	ON or OFF	ON or OFF	ON or OFF	ON or OFF	ON or OFF
VEHICLE MASTER POWER switch	ON	ON	ON	ON	ON or OFF
TRANSMISSION SHIFT control	N, D, L, R, PVT	N, D, L, R, PVT	N, D, L, R, PVT	N, D, L, R, PVT	N, D, L, R, PVT
Parking Brake	ENGAGED or RELEASED	ENGAGED or RELEASED	ENGAGED or RELEASED	ENGAGED or RELEASED	ENGAGED or RELEASED
Driver's hatch handles	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED
Intercommunication Monitor switch	INT ONLY	INT ONLY	INT ONLY	INT ONLY	INT ONLY
Domelight	ON	ON	ON	ON	ON
LIGHT switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
AIR HEATER control	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
NIGHT PERISCOPE	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
BILGE PUMP	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
SMOKE GENERATOR	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION

TABLE H

POSITON OF CONTROLS FOR TASKS IN MODULE H WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK 1H
TURRET Power switch	ON or OFF
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D, L, N, R, PVT
Parking Brake	ENGAGED OR RELEASED
Driver's Hatch handles	OPEN or CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	OFF
Air Heater control	OFF
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICAL IDLE switch	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE I

POSITION OF CONTROLS FOR TASKS IN MODULE I WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK 1I
Turret Power switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D, L, N, R, PVT
Parking Brake	ENGAGED OR RELEASED
Driver's Hatch handles	OPEN or CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	OFF
TACTICLE IDLE SWITCH	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE J

POSITION OF CONTROLS FOR TASKS IN MODULE J WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1J and 2J
TURRET Power switch	ON or OFF
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D, L, N, R, PVT
Parking Brake	ENGAGED OR RELEASED
Driver's Hatch handles	OPEN or CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome Light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE switch	ANY POSITION
PERSONNEL HEATER	OFF

TABLE K

POSITION OF CONTROLS FOR TASKS IN MODULE K WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS		
	1K	2K	3K
TURRET Power switch	ON or OFF	OFF	ON or OFF
VEHICLE MASTER Power switch	ON	OFF	ON or OFF
TRANSMISSION SHIFT Control	D,L,N,R, PVT	N	N
Parking Brake	ENGAGED OR RELEASED	ENGAGED	ENGAGED
Driver's Hatch handles	CLOSED	OPEN or CLOSED	CLOSED
Intercommunication Monitor Switch	INT ONLY	INT ONLY	INT ONLY
Dome light	ON	ON	ON
LIGHT switch	OFF OR SERVICE LIGHTS	OFF	ANY POSITION
Drain Valve handles	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	OFF	ANY POSITION
Air Heater control	ANY POSITION	OFF	ANY POSITION
NIGHT PERISCOPE	OFF	OFF	OFF
BILGE Pump	ANY POSITION	OFF	ANY POSITION
SMOKE GENERATOR	ANY POSITION	OFF	ANY POSITION
TACTICLE IDLE switch	ANY POSITION	OFF	ANY POSITION
PERSONNEL HEATER	OFF	OFF	ANY POSITION

TABLE L

POSITION OF CONTROLS FOR TASKS IN MODULE L WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK 1L
TURRET Power switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D,L,N,R,PVT
Parking Brake	ENGAGED or RELEASE
Driver's Hatch handles	OPEN or CLOSED
Intercommunication Monitor Switch	ON
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE switch	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE M

POSITION OF CONTROLS FOR TASKS IN MODULE M WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1M	2M	3M
TURRET Power switch	ON	ON or OFF	OFF
VEHICLE MASTER Power switch	ON	OFF	OFF
TRANSMISSION SHIFT Control	N	N	N
Parking Brake	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN or CLOSED	OPEN or CLOSED	CLOSED
Intercommunication Monitor switch	INT ONLY	INT ONLY	INT ONLY
Dome light	ON	OFF	OFF
LIGHT switch	ANY POSITION	OFF	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	OFF	OFF
Air Heater control	ANY POSITION	OFF	OFF
NIGHT PERISCOPE	ANY POSITION	OFF	OFF
BILGE Pump	ANY POSITION	OFF	OFF
SMOKE GENERATOR	ANY POSITION	OFF	OFF
TACTICLE IDLE switch	ANY POSITION	OFF	OFF
PERSONNEL HEATER	ANY POSITION	OFF	OFF

TABLE N

POSITION OF CONTROLS FOR TASKS IN MODULE N WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1N	2N	3N	4N	5N
TURRET Power switch	ON	ON	ON	ON or OFF	ON or OFF
VEHICLE MASTER Power switch	ON	ON	ON	ON	ON
TRANSMISSION SHIFT Control	D,R, PVT,L	D,R, PVT,L	D,R, PVT,L	N	N
Parking Brake	OFF	OFF	OFF	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED
Intercommunication Monitor switch	ON	ON	ON	ON	ON
Dome light	ON	ON	ON	ON	ON
LIGHT switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
Air Heater control	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
NIGHT PERISCOPE	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
BILGE Pump	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION
SMOKE GENERATOR	ANY POSITION	ANY POSITION	ANY POSITION	OFF	OFF
TACTICLE IDLE switch	OFF	OFF	OFF	ANY POSITION	ANY POSITION
PERSONNEL HEATER	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION	ANY POSITION

TABLE O

POSITION OF CONTROLS FOR TASKS IN MODULE O WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 10	20	30	40	50	60	70	80	90
TURRET Power switch	ON	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF
VEHICLE MASTER Power switch	ON	ON	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF
TRANSMISSION SHIFT Control	N	N	N	N	N	N	N	N	N
Parking Brake	RELEASED	ENGAGED	ENGAGED	ENGAGED	ENGAGED	ENGAGED	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch handles	OPEN	OPEN	OPEN OR CLOSED	OPEN OR CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN
Intercommunication Monitor Switch	ON	ON	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF
Dome light	ON	ON	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF	ON OR OFF
LIGHT switch	ANY POSITION	ANY POSITION	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Air Heater control	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
NIGHT PERISCOPE	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
BILGE Pump	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SMOKE GENERATOR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TACTICLE IDLE switch	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
PERSONNEL HEATER	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

TABLE P

POSITION OF CONTROLS FOR TASKS IN MODULE P WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1P	2P	3P	4P	5P
TURRET Power switch	ON OR OFF	ON OR OFF	ON	ON	ON
VEHICLE MASTER Power switch	ON	ON	ON	ON	ON
TRANSMISSION SHIFT Control	N	N	D,L,PVT,R	D,L,R,N,PVT	N
Parking Brake	ENGAGED	ENGAGED	RELEASED	RELEASED OR ENGAGED	ENGAGED
Driver's Hatch handles	OPEN	OPEN	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED
Intercommunication Monitor Switch	ON	ON	ON	ON	ON
Dome light	ON	ON	ON	ON	ON
LIGHT switch	OFF	OFF	ANY POSITION	ANY POSITION	OFF
Drain Valve handles	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	ANY POSITION	ANY POSITION	OFF
Air Heater control	OFF	OFF	ANY POSITION	ANY POSITION	OFF
NIGHT PERISCOPE	OFF	OFF	ANY POSITION	ANY POSITION	OFF
BILGE Pump	OFF	OFF	ANY POSITION	ANY POSITION	OFF
SMOKE GENERATOR	OFF	OFF	ANY POSITION	ANY POSITION	OFF
TACTICLE IDLE switch	OFF	OFF	OFF	OFF	OFF
PERSONNEL HEATER	OFF	OFF	ANY POSITION	ANY POSITION	OFF

TABLE Q

POSITION OF CONTROLS FOR TASKS IN MODULE Q WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1Q,2Q, and 3Q
TURRET Power switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	N,D,R, PVT
Parking Brake	ENGAGED OR RELEASED
Driver's Hatch handles	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE switch	OFF
PERSONNEL HEATER	ANY POSITION

TABLE R

POSITION OF CONTROLS FOR TASKS IN MODULE R WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1R	2R
TURRET Power switch	ON or OFF	ON or OFF
VEHICLE MASTER Power switch	ON or OFF	OFF
TRANSMISSION SHIFT Control	N,R,L. PUT,D	N
Parking Brake	RELEASED	ENGAGED
Driver's Hatch handles	OPEN	OPEN
Intercommunication Monitor Switch	INT ONLY	INT ONLY
Dome light	ON	ON
LIGHT switch	ANY POSITION	OFF
Drain Valve handles	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	OFF
Air Heater control	ANY POSITION	OFF
NIGHT PERISCOPE	ANY POSITION	OFF
BILGE Pump	ANY POSITION	OFF
SMOKE GENERATOR	ANY POSITION	OFF
TACTICLE IDLE switch	ANY POSITION	OFF
PERSONNEL HEATER	ANY POSITION	OFF

TABLE S

POSITION OF CONTROLS FOR TASKS IN MODULE S WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1S,2S,3S,4S,5S,6S, and 7S
TURRET Power switch	OFF
VEHICLE MASTER Power switch	OFF
TRANSMISSION SHIFT Control	N
Parking Brake	ENGAGED
Driver's Hatch Handles	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	OFF
Light switch	OFF
Drain Valve Handles	CLOSED
GAS PARTICLE FILTER switch	OFF
Air Heater control	OFF
NIGHT PERISCOPE	OFF
BILGE Pump	OFF
SMOKE GENERATOR	OFF
TACTICLE IDLE switch	OFF
PERSONNEL HEATER	OFF

TABLE T

POSITION OF CONTROLS FOR TASKS IN MODULE T WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1T
TURRET Power switch	OFF
VEHICLE MASTER Power switch	OFF
TRANSMISSION SHIFT Control	N
Parking Brake	ENGAGED OR RELEASED
Driver's Hatch handles	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	OFF
LIGHT switch	OFF
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	OFF
Air Heater control	OFF
NIGHT PERISCOPE	OFF
Bilge Pump	OFF
SMOKE GENERATOR	OFF
TACTICLE IDLE switch	OFF
PERSONNEL HEATER	OFF

TABLE U

POSITION OF CONTROLS FOR TASKS IN MODULE U WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1U and 2U
TURRET Power switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D
Parking Brake	RELEASED
Driver's Hatch handles	OPEN OR CLOSED
Intercommunication Monitor Switch	ON
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE switch	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE V

POSITION OF CONTROLS FOR TASKS IN MODULE V WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK 1V
TURRET POWER switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	D,PVT,R,L,N
Parking Brake	ENGAGED or RELEASED
Driver's Hatch Handles	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve Handles	CLOSED
GAS PARTICLE FILTER Switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE Switch	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE W

POSITION OF CONTROLS FOR TASKS IN MODULE W WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK 1W
TURRET POWER switch	ON
VEHICLE MASTER Power Switch	ON
TRANSMISSION SHIFT Control	D,PVT,R,L,N
Parking Brake	ENGAGED or RELEASED
Driver's Hatch Handles	OPEN or CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome Light	ON
LIGHT Switch	ANY POSITION
Drain Valve Handles	CLOSED
GAS PARTICLE FILTER Switch	ANY POSITION
Air Heater Control	ANY POSITION
NIGHT Periscope	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE Switch	ANY POSITION
PERSONNEL HEATER	ANY POSITION

TABLE X

POSITION OF CONTROLS FOR TASKS IN MODULE X WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1X and 5X	2X,3X, and 4X	6X and 10X	7X,8X, and 9X
TURRET Power switch	ON OR OFF	OFF	OFF	ON OR OFF
VEHICLE MASTER Power switch	ON OR OFF	OFF	OFF	ON OR OFF
TRANSMISSION SHIFT Control	N,D,PVT,R,L	N	N	N
Parking Brake	RELEASED OR ENGAGED	ENGAGED	ENGAGED	ENGAGED
Driver's Hatch Handles	OPEN OR CLOSED	CLOSED	CLOSED	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY	ANY POSITION	INT ONLY	INT ONLY
Dome Light	ON OR OFF	OFF	OFF	ON OR OFF
LIGHT Switch	ANY POSITION	OFF	OFF	ANY POSITION
Drain Valve Handles	CLOSED	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION	OFF	OFF	ANY POSITION
Air Heater control	ANY POSITION	OFF	OFF	ANY POSITION
NIGHT PERISCOPE	ANY POSITION	OFF	OFF	ANY POSITION
BILGE Pump	ANY POSITION	OFF	OFF	ANY POSITION
SMOKE GENERATOR	ANY POSITION	OFF	OFF	ANY POSITION
TACTICAL IDLE Switch	ANY POSITION	OFF	OFF	ANY POSITION
PERSONNEL HEATER	ANY POSITION	OFF	OFF	ANY POSITION

TABLE Y

POSITION OF CONTROLS FOR TASKS IN MODULE Y WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASKS 1Y
TURRET Power switch	ON
VEHICLE MASTER Power switch	ON
TRANSMISSION SHIFT Control	L or D
Parking Brake	RELEASED
Driver's Hatch handles	OPEN OR CLOSED
Intercommunication Monitor Switch	INT ONLY
Dome light	ON
LIGHT switch	ANY POSITION
Drain Valve handles	CLOSED
GAS PARTICLE FILTER switch	ANY POSITION
Air Heater control	ANY POSITION
NIGHT PERISCOPE	ANY POSITION
BILGE Pump	ANY POSITION
SMOKE GENERATOR	ANY POSITION
TACTICLE IDLE switch	OFF
PERSONNEL HEATER	ANY POSITION

TABLE Z

POSITION OF CONTROLS FOR TASKS IN MODULE Z WHEN TASK PERFORMANCE BEGINS

	POSITION OF CONTROLS			
	TASKS			
CONTROLS	1Z	2Z	3Z	4Z
TURRET Power switch	ON OR OFF	ON OR OFF	ON	ON
VEHICLE MASTER Power switch	ON	OFF	ON	ON
TRANSMISSION SHIFT Control	N	N	D	N
Parking Brake	ENGAGED	ENGAGED	RELEASED	ENGAGED
Driver's Hatch handles	OPEN	OPEN	CLOSED	CLOSED
Intercommunication Monitor Switch	INT ONLY	INT ONLY	INT ONLY	INT ONLY
Dome light	ON	ON	ON	ON
LIGHT switch	OFF	OFF	ANY POSITION	OFF
Drain Valve handles	OPEN	CLOSED	CLOSED	CLOSED
GAS PARTICLE FILTER switch	OFF	OFF	ANY POSITION	OFF
Air Heater control	OFF	OFF	ANY POSITION	OFF
NIGHT PERISCOPE	OFF	OFF	ANY POSITION	OFF
BILGE Pump	OFF	OFF	ON	OFF
SMOKE GENERATOR	OFF	OFF	ANY POSITION	OFF
TACTICLE IDLE switch	OFF	OFF	ON	OFF
PERSONNEL HEATER	OFF	OFF	ANY POSITION	OFF

APPENDIX C

PERFORMANCE-ORIENTED INSTRUCTION

BASIC PRINCIPLES OF PERFORMANCE-ORIENTED INSTRUCTION[1]

The principles and guidelines that follow are applicable essentially to training on the XM1 and the MU. The training procedures for the DT, at least for OT II, will be required by Sperry Secor. During the instructor training phase for the OT, modifications should be made to these principles and guidelines to reflect the peculiarities of teaching both "procedural" tasks and "driving" tasks. Also, modifications should be made for and by the Group III instructors to reflect any tasks done on the MU which are taught orally and repeated by the soldier rather than performed. The document referenced below should be reviewed by OT II instructor personnel.

1. Present only the information the soldier must know to perform the task adequately and safely.

   a. This means that you must tell the soldier only what he must do and how to do it adequately and safely.

2. Present the essential "how to " information only when the soldier needs it for tank performance, a step at a time.

   a. This measn that you must avoid showing and explaining how to perform a task before he has a chance to use the information. The reason for avoiding this is that the soldier won't remember your instructions, and you must give it all to him again when he has a chance to perform. This wastes much time.

3. Require the soldier to apply the "how to" information immediately in "hands on" task performance. (Or, for the MU, immediately by repeating orally.)

   a. This means that the soldier must do (or say) what you do (or say) as soon as possible after you demonstrate and explain how to perform a step, and you must see that he does it, not just watch and listen.

   b. Requiring the soldier to apply the information in "hands on" performance puts an important responsibility on the trainer. That responsibility is to establish situations during practice periods that will cause the soldier to learn how to perform a task. Here, there is one important thing to watch for. What you prepare for the soldier to do as a practical exercise will depend primarily on the type of job task he is to learn. In most cases the practical exercise situation will be straightforward as you will be working with a task in which the conditions, procedure and outcome never vary. The soldier will repeatedly work with the same information, practice the same procedure and attempt to achieve the same outcome each practice trial.

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[1]Based on Osborn, W.C., Ford, J.P., Moon, H.L., Campbell, R.C., Root, R.L., and Ward, L.E. Course Outline: Instruciton for Unit Trainers in How to Conduct Performance Training. Human Resources Research Organization (HumRRO), Final Report (FR-CD-L-75-3), 1975.

In these cases you will simply have him practice the procedure until he can do it correctly. In other cases the basic procedure in performing a task will not change, but certain given conditions or information govern the outcome of task performance. So, when you are preparing the practice session, be sure to consider the type of task to be learned -- is it the type that must be practiced under different conditions or with different information given, or must the procedure be practiced under the same conditions and with the same information each time.

4. Permit each soldier to learn each step and develop his skill at his own pace.

a. This principle allows a soldier to practice as little or as much as he needs to develop a skill.

b. Fast learners can be tested (checked out) while slower learners are still developing their skill. Fast learners can then be assigned to help the slower learners who need help. This can make the job of an instructor much easier and speed up the training. One note of caution: if peer instructors are used be sure they apply the principles of performance training and demonstrating that you have applied.

5. Aid soldiers' learning by coaching them.

a. Coaching involves four things:

(1) Telling or showing a soldier as many times as necessary for him to learn something difficult.

(2) Prompting recall of what to do next, or of how to do something, by asking questions.

(3) Preventing a soldier from doing something wrong. It is better to prevent an error, if possible, than to have a soldier correct it, especially if the error would cause personal injury or equipment damage.

(4) Reinforcing correct performance by assuring the soldier that he is doing something correctly. When you tell a soldier he is doing it right, he is encouraged to try harder and he learns laster. Unfortunately, many instructors either fail to give positive reinforcement or fail to give it as often as they should.

b. One thing should be remembered about coaching: the soldier is the one who should be practicing, not you. If you show him how to do a step in a task, return the equipment to its previous condition so he can do that part of the task.

6. Establish quality control by reliably administering performance tests. Training is effective if the soldiers are able to perform the task to the level specified in the task analysis by the training objective. Performance tests are the tools to help you determine whether the objectives have been mastered. A discussion on test development and some performance test examples are at Appendix D.

GUIDANCE FOR CONDUCTING PERFORMANCE-ORIENTED INSTRUCTION[1]

1. Prepare to demonstrate the task.

   a. Obtain the training objective and performance test. You must have the performance test to adequately check student performance after training.

      Check the objective carefully. This tells you exactly what the soldier must do or tell you he would do.

      Insure you can perform the task.

   b. Identify all acts and key (critical) points in performance of the task.

      Perform the task and pay careful attention to everything you do, regardless of how small an act may be, and ask yourself why you do everything you do. This will enable you to explain it to the soldiers.

      Note all possibilities for injury of self or others and how to avoid them.

      Note all possibilities for damage to equipment or materials and how to avoid them.

      Note all acts that must be done in sequence for task performance.

      Note all specific acts that must be done at certain points to make the task easier.

      Note all conditions of equipment or materials at certain points to make the task easier.

   c. Prepare the set-up for demonstration so that everyone can clearly see and hear you.

      Position equipment and materials so soldiers can see the demonstration as they will when they are performing the task.[2]

      Assure that soldiers are placed so they can see you.[2]

[1]Based on Osborn, W.C., Ford, J.P., Moon, H.L., Campbell, R.C., Root, R.L., and Ward, L.E. Course Outline: Instruction for Unit Trainers in How to Conduct Performance Training. Human Resources Research Organization (HumRRO), Final Report (FR-CD-L-75-3), 1975.

[2]This may be very difficult in the XM1 because the Driver's station is so confining. Soldiers' may not be able to observe all of your demonstration. In fact, you may decide to de-emphasize demonstrations and begin with the soldier in place while you talk him through the first few trials.

When appropriate, provide soldiers with job aids, such as procedural checklists, troubleshooting routines, or manuals.

2. Orient students to the equipment and materials and to the task.

3. Briefly identify the equipment and materials and state their purpose, if necessary. Do not give "nice-to-know" information, such as historical background, technical characteristics, or how it does what it does.

4. Precisely state the training objective and tell soldiers exactly what they must be able to do upon the completion of training on that task.

5. Demonstrate and explain the task to be learned.[1]

   a. Emphasize that they must perform the task as you will demonstrate it to them.

   b. Show and explain one step at a time in accordance with the training objective.

   c. Identify for the soldier the part or parts you will work with or on in each step.

   d. Speak loud enough to be heard.

   e. Speak to be understood; that is, speak deliberately and use non-technical terms.

   f. Strongly emphasize each key (critical) point you have noted in your analysis of the task. Don't just mention them; emphatically call attention to them.

   g. Explain why a step must be performed in a particular way--to prevent personal injury or equipment damage, or to avoid unnecessary difficulty in performing the step.

6. Make what you do clearly visible from the soldiers' viewpoint.[2]

   a. The "soldiers' viewpoint" is (or very nearly) the direction in which the soldier will see his hands and what he will work with or on when performing the task.

   b. If precisely what you do must be hidden from view, carefully show what you will be working on and carefully explain how you will perform so that their mental imagery can give them some idea of the precise action.

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[1] See Note 2 on preceding page

[2] Ibid

7. After demonstrating and explaining each step, ask for and answer relevant questions, but defer irrelevant questions.

   a. When soldiers ask questions relevant to performance of a step, answer them by carefully showing and explaining again what they want to know.

8. When appropriate, demonstrate alternate procedures for performing a task under different conditions.

   a. An example is a modified procedure for performing a task at night, rather than in daytime.

   b. Alternate procedures, if much different, should be taught after the basic (usual) procedure has been mastered.

9. Conduct the walk-through phase. (If task is simple, this phase may not be needed. If the task is difficult, several repetitions may be necessary.)

   a. Pace the walk-through by telling the soldier when to perform each step.

   b. Explain how to perform the step and observe performance.

   c. Coach those who have difficulty.

   d. Reinforce correct performance by saying, "That's right," "Good," "Fine," or the like.

10. Supervise practice.

   a. Require soldiers to perform without your telling them when and how to perform each step, unless individuals need help.

   b. Coach those who need help.

   c. Reinforce correct performance by letting them know they are doing well.

   d. Qualify, assign and supervise peer (assistant) instructors.

      1. If the task is relatively simple, you will recognize fast learners whom you can assign as peer instructors to aid one or more slow learners.

      2. If task is difficult or dangerous, qualify the fast learners by asking them "smoke out" questions about key points to be sure they understand: "Why do you do that?" What would happen if . . .?" "How can you be sure that ...?"

      3. If soldiers are in small groups, the first one to walk through probably can qualify as the assistant.

      4. You must observe peer instructors to be sure that they are prompting and coaching correctly.

   e. When soldiers have learned the task procedure, instruct them to practice to develop skill and speed.

   f. Remind them of the performance standard and time limitation of task performance.

g. Instruct soldiers to let you know when he thinks he is ready for check-out (testing) on the task(s).

11. Administer performance tests. (See Appendix D.).

APPENDIX D

TEST DEVELOPMENT

Each hands-on test will have four major parts:

- Performance measures, which consist of actions that the soldier must perform or specifications of the product of correct performance. Each performance measure is scored as Pass or Fail during the test, and a pre-determined number of performance measures must be scored Pass (normally all) for the soldier to receive a GO on the test.

- Test conditions, which include acceptable environmental conditions, equipment, tools, and manuals required, and test set-up.

- Instructions to the soldier, consisting at a minimum of the task statement, including any special information on where the soldier is to start and complete the task if the full task is not to be performed.

- Instructions to the test administrator, telling him how to set up the test, how to handle each soldier during the test, where to position himself to be able to observe the soldier, and any special instructions on how to score.

As with any test development, the starting point should be the task analysis or task summary. Be certain that it is complete, and that standards for correct performance are specified. Concentrate on the production of good performance measures (either product, process, or a combination of both). During development and refinement of these performance measures, you should keep in mind what condition the equipment must be in, what guidelines the test administrator will need, and what instructions the soldier will require. If you do this and maintain an informal note system as you refine the performance measures, the test conditions and instructions to mechanics and test administrators will essentially be written by the time the performance measures are completed.

A sample hands-on test follows. Guidance on how to develop hands-on tests is contained in Chapter 4 of Guidelines for Development of Skill Qualification Tests (Department of the Army, December 1977).

HANDS-ON TEST

TASK: CHECK DRIVER'S INSTRUMENT PANEL SWITCHES AND GAGES

A. REQUIRED EQUIPMENT

Tank

DEP 9-2350-255-10-1 (Operator's Manual)

B. PROCEDURE TO SET UP STATION

1. Open driver's hatch.
2. Turn VEHICLE MASTER POWER switch ON.
3. Turn dome light ON.
4. Traverse turret so gun is over side of the tank.
5. Check fuel level. If it is low, add fuel to the XM1 until the level is acceptable.

C. PROCEDURE TO PREPARE TO TEST EACH SOLDIER

1. Place operator's manual on the floor of the driver's compartment.
2. Open FIRE EXTINGUISHER 2ND SHOT cover.
3. Turn circuit breaker 29 OFF.

D. PROCEDURE TO CONDUCT AND SCORE THE TEST

1. Score the test from the front deck looking into the driver's compartment.
2. To score PM 3, "Checks fuel level by . . . ," score only whether the soldier turns the FUEL SELECTOR SWITCH while looking in the general direction of the fuel gage and returns the switch to REAR.

SCORESHEET

CHECK DRIVER'S INSTRUMENT PANEL SWITCHES AND GAGES

INSTRUCTIONS TO SOLDIER: You are powering up hull systems. You have checked the master panel switches and adjusted the indicator and internal instrument lights. You must now check the instrument panel switches and gages. You will have ___ minutes.

PERFORMANCE MEASURES			PASS	FAIL
1. Closes FIRE EXTINGUISHER 2ND SHOT COVER.			____	____
2. Turns circuit breaker 29 ON.			____	____
3. Checks fuel level by:	Yes	No		
a. Turning FUEL SELECTOR SWITCH to RIGHT FRONT.	___	___		
b. Turning FUEL SELECTOR SWITCH to LEFT FRONT.	___	___		
c. Returning FUEL SELECTOR SWITCH to REAR.	___	___		
(All must be YES.)			____	____
4. Completes checks within ___ minutes.			____	____

COMMENTS ON SAMPLE HANDS-ON TEST

The main problems with testing this task relate to giving the scorer something to see without damaging the tank. These problems occur with almost all tasks that involve checking. In some cases a scorer can tell if a soldier turns his head or bends over to make a check. Scorers do not know for sure whether the soldier was making a check or experiencing a gas pain, but they can be confident that soldiers who do not move part of their body do not make the check. This task does not allow even that limited approach to scoring checking since all the switches and gages are in the same general location.

The best approach would be to offset switches and create malfunctions that would register on the gages. The scorer would check soldiers' reactions to the induced conditions. That is the general approach taken in this test, but it, too, is limited. Three checks are not covered. Checking the RPM gage and reacting to the INTERCOM INOPERATIVE light cannot induce and correct malfunctions in the RPM gage and intercom system without risking damage to the XM1. Reacting to the CABLE DISCONNECT caution light is also not covered, but it could be if the scorer disconnected a cable. The problem is that as of June 80, the subject matter experts have not been able to find which hull cables this light covers.

Four "checking" behaviors are observable in this test. Checking the FIRE EXTINGUISHER 2ND SHOT cover is scored by seeing if the soldier closes the cover. (Even this may be too dangerous if experience shows that soldiers might kick the switch while entering the driver's compartment.) The score for checking the ELECTRICAL SYSTEM gage and responding to the CIRCUIT BREAKER OPEN light are based on whether the soldier switches the circuit breaker to ON. Checking fuel levels can be scored without manipulating the conditions since it involves observable actions.

APPENDIX E

TRAINING RESOURCE REQUIREMENT FORMS

PERSONNEL REQUIREMENTS

Please provide the information requested below for each person involved in the planning, development, conduct, and evaluation of the XM1 driver training program.

Name: _____ Rank/Grade: _____ MOS: _____

Function (See Note A)	Training Group (See Note B)	Role (P/S) (See Note C)	Time (hours) (See Note D)
Planning	I: DT		
	II: DT + XM1		
	III: XM1 + Mockup		
Development	I: DT		
	II: DT + XM1		
	III: XM1 + Mockup		
Conduct	I: DT		
	II: DT + XM1		
	III: XM1 + Mockup		
Evaluation	I: DT		
	II: DT + XM1		
	III: XM1 + Mockup		

Note A: Planning includes scheduling, determining personnel and equipment requirements, logistics, etc.
Development includes writing and review of lesson plans, test materials, etc.
Conduct includes actual training and testing time during implementation.
Evaluation includes pre- and post-training testing and transfer study testing.

Note B: Group I soldiers are trained on the Driver Trainer only.
Group II soldiers are trained on the Driver Trainer, supplemented with training on an XM1 tank.
Group III soldiers are trained on an XM1 tank, supplemented with a wooden mockup of the tank.

Note C: Primary (P) Role means the person directed or was responsible for major portions of work in that function.
Support (S) Role means the person assisted or was under the supervision of someone in a primary role.
If neither, leave blank.

Note D: If the time expended on a function is for more than one training group, record the time wherever applicable, and attach a note telling how many hours are recorded for more than one group, and for which functions/groups they are recorded.

VEHICLE USE

Please provide the information requested below for each vehicle required to conduct the XM1 driver training program. (If any personnel are required solely for operation of a vehicle, please complete the Personnel Requirements Form for them.)

Group: _____ I - Driver Trainer
_____ II - Driver Trainer and XM1 Tank
_____ III - XM1 Tank and Mockup

Vehicle Type and Number	Picked Up		Turned In		Actual Use Time	Training Block
	Time/Date	Mileage	Time/Date	Mileage		
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

EQUIPMENT USE

Please provide the information requested below for each equipment item required to conduct the XM1 driver training program.

Group: _____ I - Driver Trainer
_____ II - Driver Trainer and XM1 Tank
_____ III - XM1 Tank and Mockup

Equipment Item	Quantity	Expended ? (Yes/No)	Needed for what (Number) module/task?
.	.	.	.
.	.	.	.
.	.	.	.

SOLDIER TRAINING REPORT
GROUP I:
DRIVER TRAINER

Please provide the information requested below for each soldier in the XMI driver training program, Group I: trained primarily on the Driver Trainer. The information should be taken from the Driver Trainer printouts and from records kept during training.

Name: _____

	Procedure/Program	Time Spent	Number of Tries
Block 1:	(List all procedures, driving programs, and manual programs for DT/XMI/Mockup Tasks. Trained on DT.)		
Block 2:	Manuever Pretest Score: _____ (List all procedures, driving programs, and manual programs for XM1/DT Tasks. Trained on DT.)		
Block 3:	(List all procedures, driving programs, and manual programs for DT Tasks. Trained on DT.)		
Block 4:	(List all modules/lessons for XMI Tasks. Trained in classroom.)		

SOLDIER TRAINING REPORT
GROUP II:
DRIVER TRAINER AND XM1 TANK

Please provide the information requested below for each soldier in the XM1 driver training program, Group II: trained on the Driver Trainer and on the XM1 tank. The information should be obtained from Driver Trainer printouts and from records kept during training.

Name: _____

Block 5: (List all procedures, driving programs, and manual programs for DT/XM1/Mockup Tasks. Trained on DT.)

Time Spent	Number of Tries
.	.
.	.
.	.

Block 6: Manuever Pretest Score: _____
(List all procedures, driving programs, and manual programs, and all analagous tasks, for DT/XM1 Tasks. Trained on DT and XM1.)

Trained on DT		Trained on XM1		
Time Spent	Number of Tries	Date/Time begun	Date/Time Completed	Numbe of Tri
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.

Block 7: (List all procedures, driving programs, and manual programs for DT Tasks. Trained on DT.)

Time Spent	Number of Tries
.	.
.	.
.	.

Block 8: (List all modules/tasks for XM1 Tasks. Trained on XM1.)

Date/Time begun	Date/Time Completed	Number of Tries
.	.	.
.	.	.
.	.	.

SOLDIER TRAINING REPORT
GROUP III:
XM1 TANK AND MOCKUP

Please provide the information requested below for each soldier in the XM1 driver training program, Group III: trained on the XM1 tank and on a wooden mockup of the tank.

Name: _____

		Date/Time Begun	Date/Time Completed	Number of Tries
Block 9:	(List all modules/tasks for DT/SMI/Mockup Tasks. Trained on mockup.)			
Block 10:	Manuever Pretest Score: ____ (List all modules tasks for DT/XM1 Tasks. Trained on XM1.)			
Block 11:	(List all modules/tasks for DT Tasks, except degraded driving. Trained on mockup.)			
Block 12:	(List all modules/tasks for XM1 Tasks. Trained on XM1.)			

TRANSFER TEST RECORD

Please provide the information requested below for each soldier in the XM1 driver training program.

Name:_____ **Group:** _____ **I - Driver Trainer**

_____ **II - Driver Trainer and XM1**

_____ **III - XM1 and Mockup**

Transfer Study Task		Pass/Fail
Block 1,5,9:	DT/XM1/Mockup Tasks. Tested on XM1.	_____
Block 2,6,10:	DT/XM1 Tasks. Tested on XM1.	_____
Block 3,7,11:	DT Task Programs. Tested on DT.	_____
Block 4,8,12:	XM1 Tasks. Tested on XM1.	_____